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Rock Products

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Chicago, October 26, 1929 (Issued Every Other Week) Volume XXXII, No. 22

Tangled Ruins of Fire-Razed Block Give Way to Hercules Power

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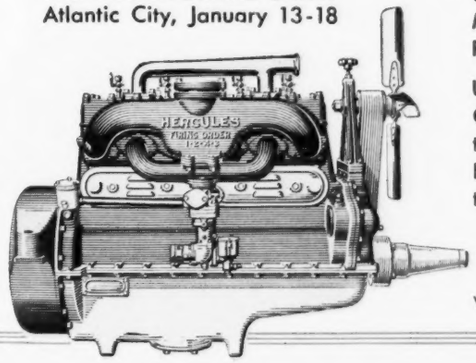

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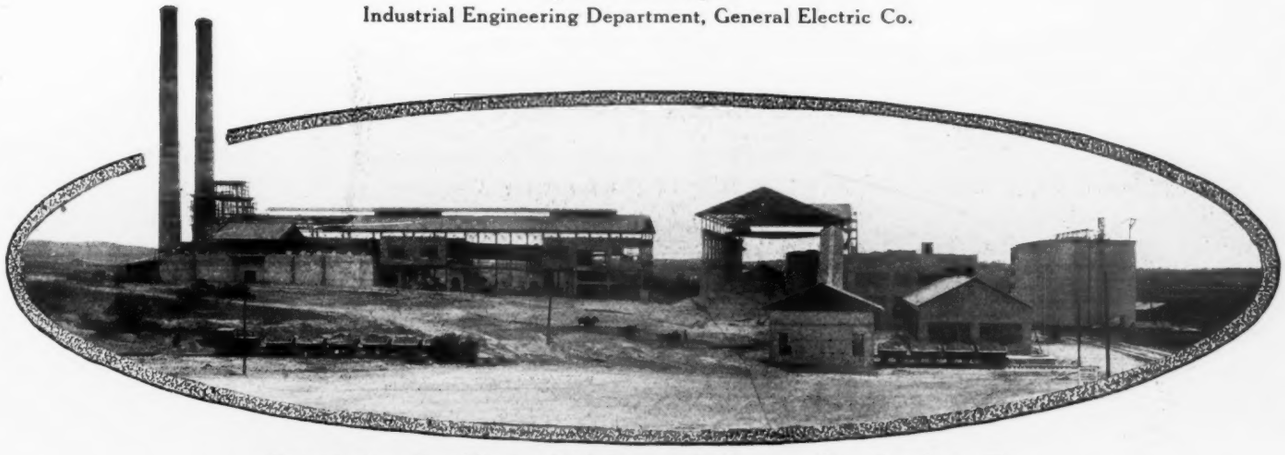
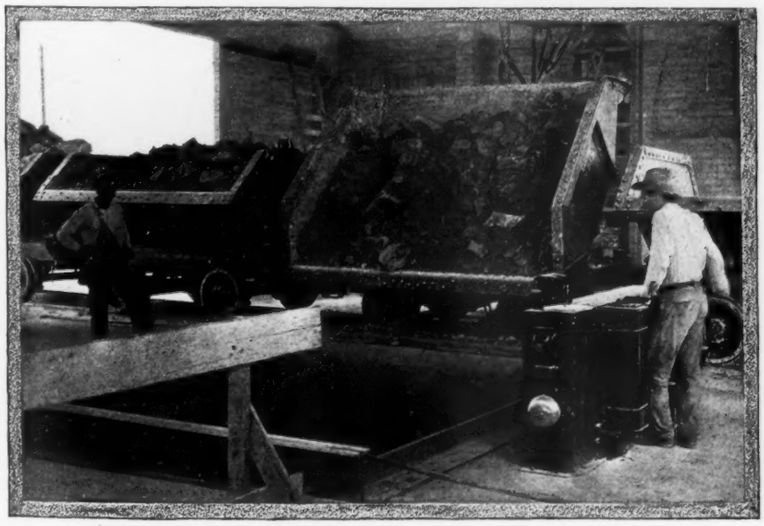
New Plant of the Republic Portland Cement Company

By Present Standards, a Mechanically Perfect Plant!

By R. H. Rogers
Industrial Engineering Department, General Electric Co.



General view, Republic Portland Cement Co.'s new mill at Longhorn, Tex.



Quarry cars dumping limestone at the primary crusher

LONGHORN TEXAS STEERS passed into history nearly forty years ago, after more than ten million had been turned into beef. Longhorn brands on ten million flanks will be exceeded in two years by Longhorn brands on cement sacks that will be filled at the Republic Portland Cement Co.'s new mill at Longhorn, Texas. In September, 1928, cotton was being picked from a field twelve miles northeast of San Antonio while engineers were staking out a cement mill. In August, 1929, the first cement was shipped from the 3600-bbl. mill which, together with the village of Longhorn, had thus been brought to practical completion in less than eleven months. The cement company, to emphasize its "all Texas" character, adopted its name Republic from Texas history and Longhorn for its brand and village from the cattle that first brought

The 2-cu. yd. electric shovel digging rock in the quarry

Part of a train of loaded cars en route to the crusher house

attention to the fact that Texans do things "in a big way."

The Republic Portland Cement Co.'s mill is marked by several unique features that will tend to make a new low record for kilowatt hours of electrical energy per barrel of cement. They are: No overburden in quarry; crusher plant and quarry on same level; a single hammer mill does all the crushing; minimum of rehandling; and gas fuel which eliminates coal mill and attendant machinery. Natural cement rock underlies the site. Gas for clinker burning is purchased from the Southern Gas Co. Gypsum comes from Falfurias, 200 miles away. Water is supplied by two deep wells. Electric power is purchased from the San Antonio Public Service Co. Transportation

The townsite of Longhorn as seen from the plant; the laboratory building is at the water tower and the company office in the right background

Gasoline well drill working in the quarry

is via the Missouri, Kansas and Texas R. R.; International Great Northern R. R., and the San Antonio-Austin highway. The mill construction is characterized by the extensive use of concrete resulting in an unusually small amount of steel structure. The plant presents a pleasing appearance with its buff colored stuccoed concrete tile walls and its red corrugated cement asbestos roofing.

The land is gently sloping with a total difference in elevation of 125 ft. The mill itself is on a rise of about 35 ft. from the substation at the south to the stacks at the north end. The office and laboratory are in separate mission type buildings on a hillside west of the plant across a slight depression. The laboratory is notably spacious, and included in the equipment is an Olsen 300,000-lb. testing machine. Still further back on the west hill is the village of Longhorn, designed to comfortably house about 120 families. It is made up of a White ward, a Mexican ward and a Negro ward. The houses are neat frame bungalows already nicely surrounded by lawns and flowering shrubs. Water, gas and electricity are furnished from the mill. A commissary building houses nearly everything in the food and furnishing line that will be needed by the villagers.

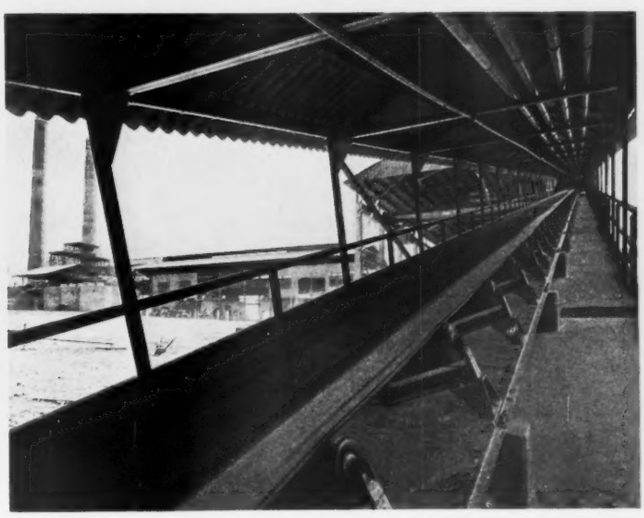
Grading, sodding and planting are going on under the supervision of a landscape architect, and in another year the whole property will have taken on the appearance of a city park subdivision.

The Terrell Bartlett Engineers, Inc., of San Antonio were the engineers for the project, with Richard K. Meade and Co. of Baltimore, Md., as consulting engineers. The construction work in general was carried on by the forces of Smith Bros., Inc., while the Bland Engineering Co., of Minneapolis, Minn., built the slurry tanks, silos and pack-houses, and the Heine Chimney Co., of Chicago, Ill., built the two 200-ft. chimneys under subcontracts. The General Electric Co., of Schenectady, N. Y., furnished the entire electrical equipment, consisting of about 77 motors aggregating 6580 hp. together with their complement of

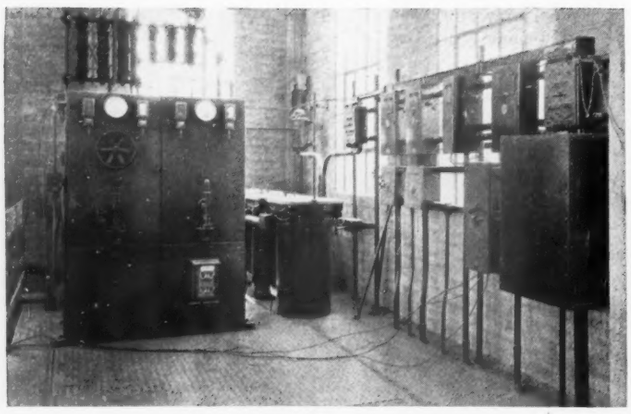
Wagon-mounted hammer drill for auxiliary drilling

Loading a train of 8-cu. yd. cars in the quarry

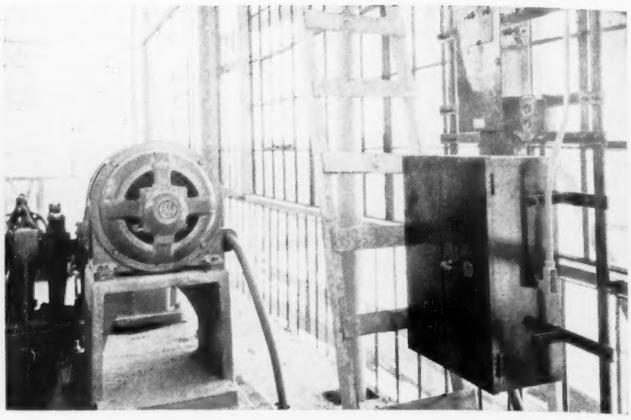
Car spotting equipment in front of the crusher house



Belt conveyor carrying rock from crusher house to storage



Transformers and controllers for the crusher house equipment located in the crusher building



Motor drive of the belt conveyor carrying crushed stone from crusher building to storage

switchboards, transformers, switchgear, cables and control apparatus. The kilns, coolers and mills were furnished by the Allis-Chalmers Manufacturing Co., of Milwaukee, Wis.

The sales territory that can be economically served with cement from San Antonio includes an area equal to that of Illinois, Indiana and Ohio combined. A large part of this area is developing in a vigorous and healthy way with consequent demands for cement for the construction of seaport structures, buildings, dams, roads, bridges, and for the many uses of an oil producing district. That corner of Texas between San Antonio, the Rio Grande and the Gulf is particularly promising as a nearby market because of a decided change that is taking place as to occupants and their pursuits. New towns are being established with concrete pavements, business houses and factories. Aviation fields are using great quantities of concrete for runways and over all surfacing. Vast quantities of cement are required for reclamation work and other state and federal projects.

The Quarry

The rock underlying the 475 acres in the property is of the Austin chalk formation laid down in the Gulf Series of the Upper Cretaceous Period. It is a soft argillaceous limestone easily quarried and crushed. Analysis shows a range from "high lime" rock to "low lime" rock of from 92% to 30% calcium carbonate. The bulk of the material is "natural cement rock," i. e., containing about 76% carbonate of lime and 21% silica and alumina.

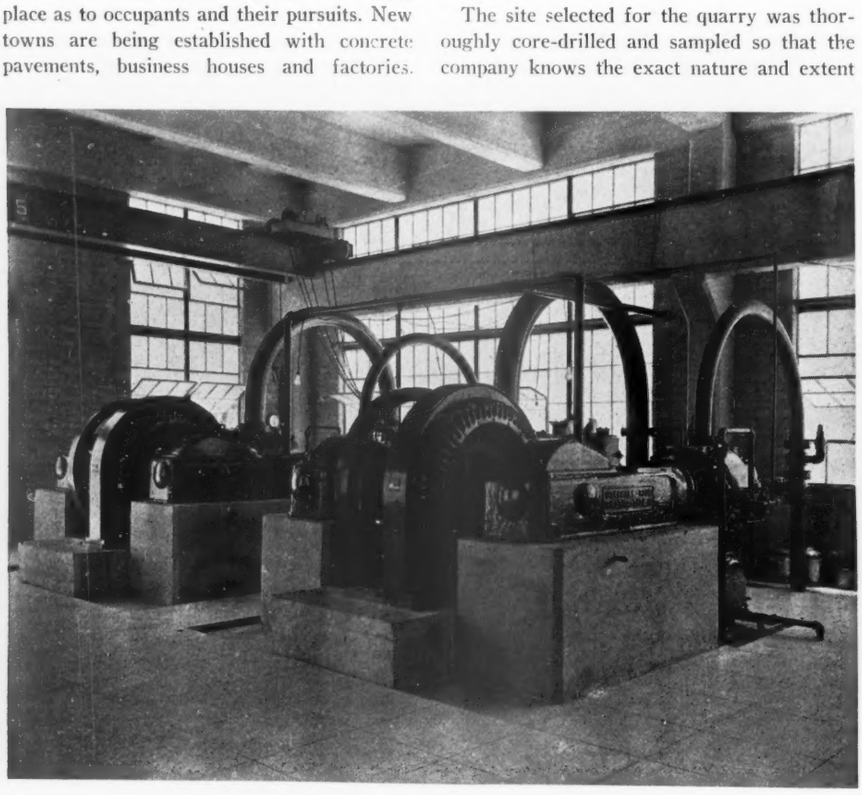
The site selected for the quarry was thoroughly core-drilled and sampled so that the company knows the exact nature and extent of its deposit. The quarry this summer has been opened up by a long cut crossing the deposit, giving a face of rock from 25 to 40 ft. high and a length of about 500 ft. Physically, the deposit is of such a nature that blasting operations will be a comparatively simple matter, the limestone being stratified and more or less shattered. Analysis of the different parts of the quarry show the rock to be a gradation from high lime to comparatively low lime. The following table shows typical analysis of the high, low and natural cement rock:

	High lime	Low lime	Natural cement rock
SiO_2	5.68	17.28	14.20
Fe_2O_3	.46	1.86	1.75
Al_2O_3	2.10	5.48	4.15
$CaCO_3$	89.98	72.81	76.36
$MgCO_3$	1.46	2.37	2.28

Whatever drilling is necessary in the quarry is done with a "Joplin Special" Keystone churn drill mounted on crawler treads and using a clutch hoist, driven by a Waukeshaw, Model V, Ricardo head, gas engine. An Ingersoll-Rand wagon drill is also available.

Only one working face is required as the high lime, cement rock and low lime are found in the exposed strata. Chemical correction is made by proper selection of high and low lime content as will be described later. The quarry floor is self-draining to a normally dry creek bed and no pumping will be required at any season. The quarry is being worked toward rising ground which will eventually give a 50-ft. face with sufficient material for more than a hundred years' production. There is no overburden to be disposed of because the thin layer of soil forms only a small percentage of the output and its analysis does not materially differ from that of the underlying rock. Power for haulage is minimized by the fact that the quarry floor is on practically the same level as the crusher house.

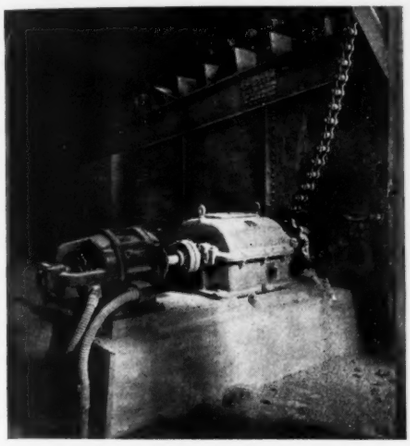
The quarry is served by a single standard-gage track a few hundred feet long, supplemented by a short siding near the crusher house. A Plymouth gasoline loco-



Air compressors in the mill building

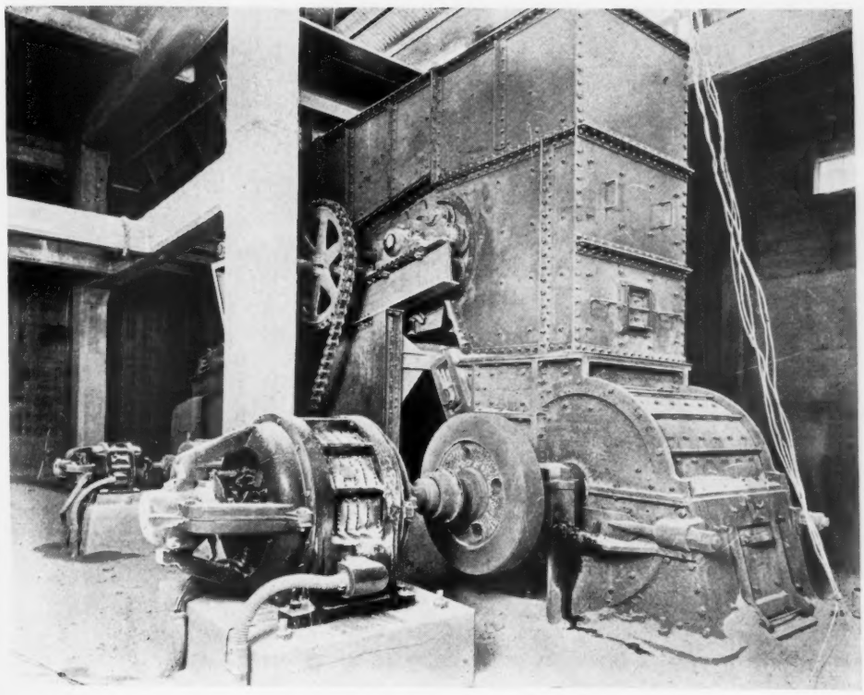
motive handles trains of six Easton side-dump cars carrying 48 tons of rock per trainload. Loading is done by a Marion Type 480 2-cu. yd. electric shovel mounted on crawler trucks and having direct-current motors operated under generator voltage control. Three 50-kv-a., 2300/400-v. transformers furnish power for the shovel and for lights. There is a four-unit four ball-bearing motor generator set on the shovel for furnishing d. c. power to the motors.

The unit consists of an 85-hp. squirrel cage motor and d. c. generators rated 50-15 and 15-kw. for the hoist, swing and crowd motors, respectively. The motors of the "mill" type are rated, 60, 23 and 23-hp. for hoist, swing and crowd respectively. An exciter set with 7½-hp. squirrel cage motor



Pan feeder conveying rock from hopper to hammermill

and 5½-kw. generator furnishes excitation for the d. c. motor and generator fields and for a 70-ft.-lb. dipper-trip motor. A railway type, electric, motor-driven air compressor furnishes air for brakes and clutch. The motor speeds and directions of rotation are entirely controlled by varying the strengths and polarities of the respective generator fields. Overloads are prevented by



The hammermill crusher—the only reduction unit in the crusher house

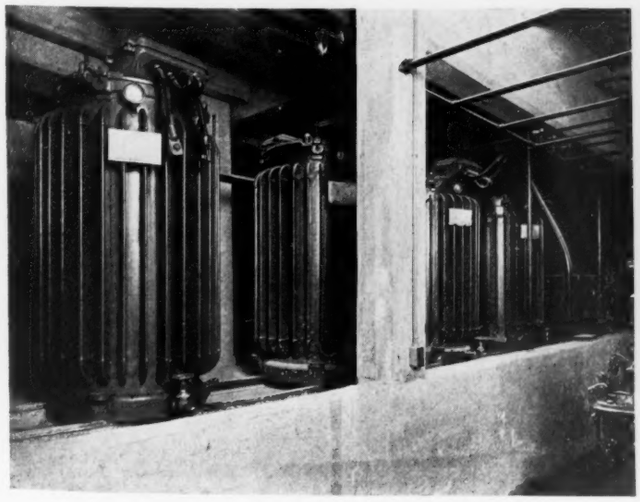
differential series fields on the generators that serve to buck the voltage down when overloads tend to occur. This system of control "the iron hand in the velvet glove," enables the shovel to meet heavy duty with a minimum of lost time and maintenance expense.

Ten hours of quarry operation will maintain the rock supply for twenty-four hours of mill operation.

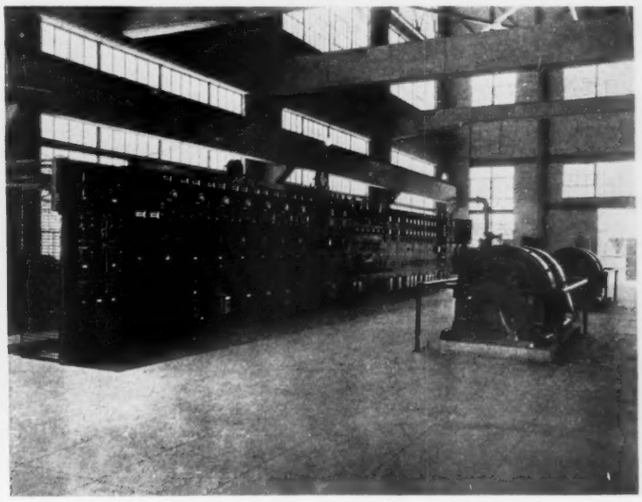
Crusher House

The single quarry product of chalky nature reduces the crusher-house machinery to one hammer mill and attendant units. The locomotive pushes the six cars through the crusher house, leaving the last car abreast the hopper. An overhead Shepard hoist powered with a crane type 20-hp. wound rotor motor operates the dumper arm and dumps the contents of the car into the hopper. The dumper arm hooks and unhooks automatically, and a counterbalance prevents a jerk when the car body passes center. A car puller consisting of a continuous chain and lug driven by a 17-hp. high resistance rotor, squirrel cage motor then pulls the train toward the quarry until another car can be dumped. When the train is empty, it is run out on the dip siding by the car puller where it rests in the low center until the locomotive hauls it to the quarry.

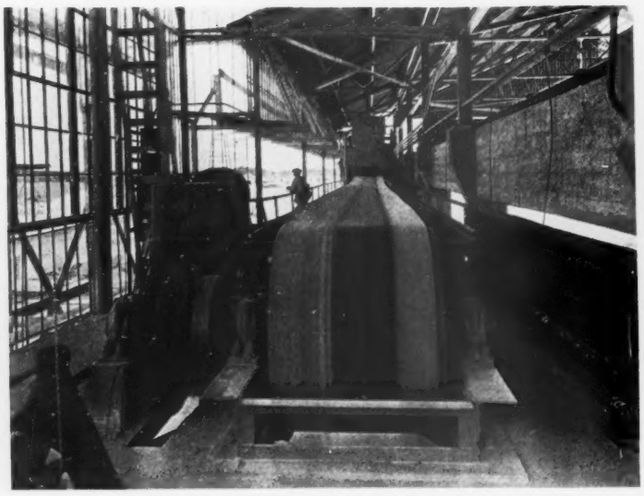
Beside the hopper is the operator's platform containing controls for all the crusher house machinery. The Dixie Machinery Co. "Mogul" crusher is in the basement and is driven by a 250-hp. 2200-v. wound rotor, induction motor. The rock is fed from the



Transformers under the mill building



Switchboard in the power house



Conveyor from crusher house; the hopper can discharge to bins or ground storage

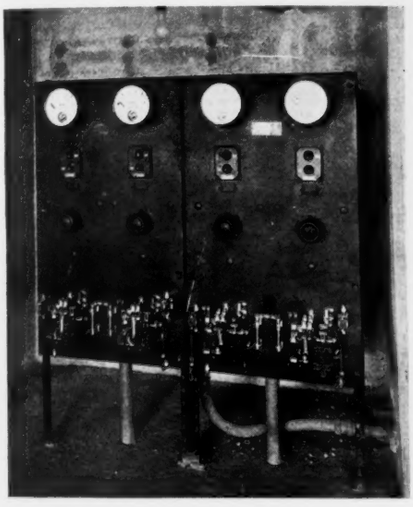
Another view of the conveyor showing the tripper discharging to ground storage at left

hopper bottom to the crusher by a Stephens-Adamson pan feeder, which is driven through a 14.7 to 1 James herringbone gear speed reducer by a 15-hp. wound rotor, induction motor. The pan conveyor operates over a wide speed range with a maximum speed of 25 ft. per minute. The speed of the pan conveyor, and hence the load on the crusher motor can be varied by the operator who watches the ammeter on the crusher motor circuit and controls the feed to keep the hammer mill load within bounds. A 5-hp. motor for adjusting the breaker plates completes the crusher-house machinery. The crusher motor is on a 2200-v. circuit and

Storage for stone, gypsum and clinker. The bins at the right center are fed by conveyor from the crusher and also by the traveling clamshell

all the other motors are supplied with 440-v. power through a bank of three 50-kv.-a. transformers, duplicates of the quarry transformers. A spare unit is stored in the crusher house for these two banks.

Close by the crusher house and supplied with power from the transformers, is the pump house. Two turbine type pumps supplied by the Pacific Pump Works, Los Angeles, Calif., furnish the plant and village water supply from 385-ft. wells. The water is of fine quality. The pumps are driven by 60- and 45-hp. U. S. Motor Co.'s asbestos protected vertical motors. A size 4 Gould 300-g.p.m. 140-ft. head centrifugal pump driven by a 20-hp. squirrel cage motor transfers water from a 50,000-gal. underground storage tank to a 50,000-gal. tank at an elevation of 100 ft. The smaller well pump and the Gould pump together can pump directly from the well to elevated tank as can the 60-hp. pump alone.



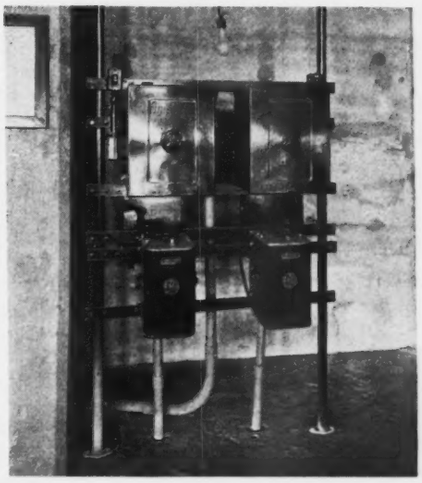
Control panels for raw grinding feed

Storage

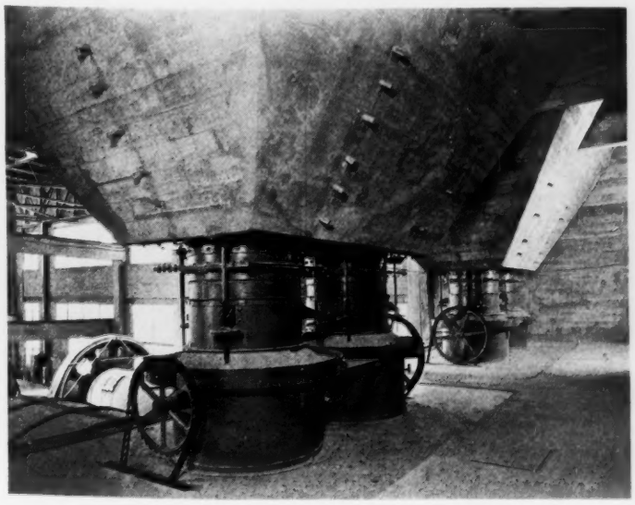
A 36-in. wide belt conveyor about 400 ft. between pulleys takes crushed stone from the crusher up a 16-deg. grade for a total elevation of 74 ft. This belt conveyor runs at 275 ft. per minute and has a maximum capacity of 250 tons per hour. A level portion 125 ft. long at the upper end allows the use of a belt-driven, hand-set tripper to discharge to storage piles or to the bins that feed the raw mills. The belt which is over 900 ft. long was furnished by the Hewitt Gutta Percha Rubber Corp., of Buffalo, N. Y., and the mechanical parts including tripper are from the Link-Belt Co. The carrier rolls are of the three-roller type and equipped with Alemite nipples for lubrication. The belt is driven by a 40-hp. squirrel cage motor through an 855/60 r.p.m. speed reducer and chain and sprocket drive.

The outside storage space for high and

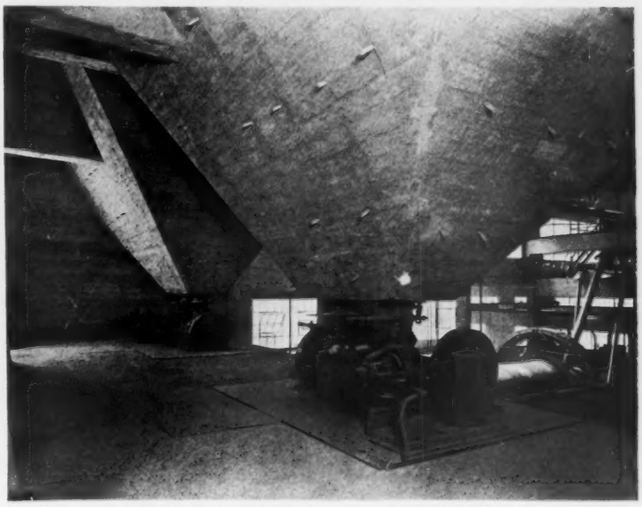
The raw bins are filled by belt conveyor from the crusher and the overhead clamshell distributes material in storage



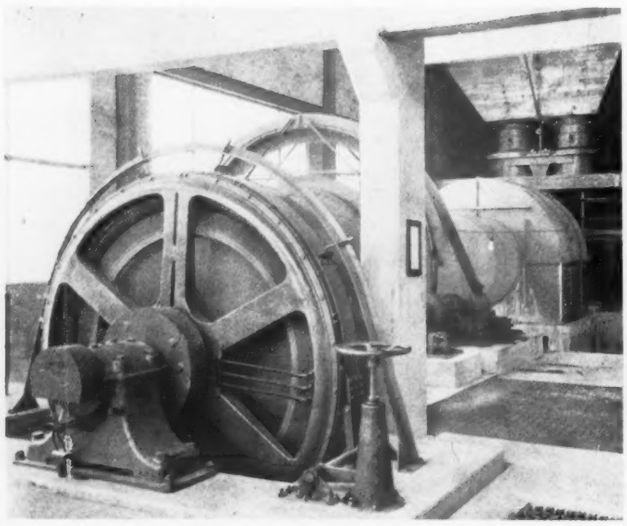
Control equipment for finish grinding



High and low lime rotary table feeders supplying raw mix to the mills

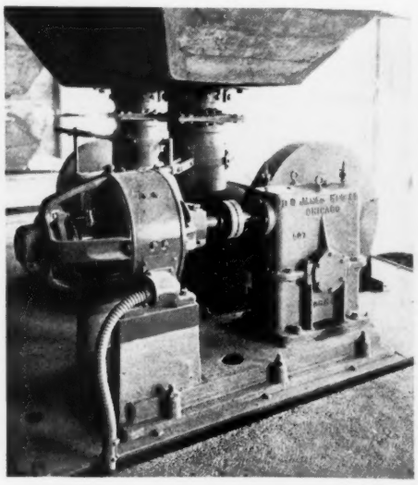


Two table feeders feeding gypsum and clinker to the finish grinding mills



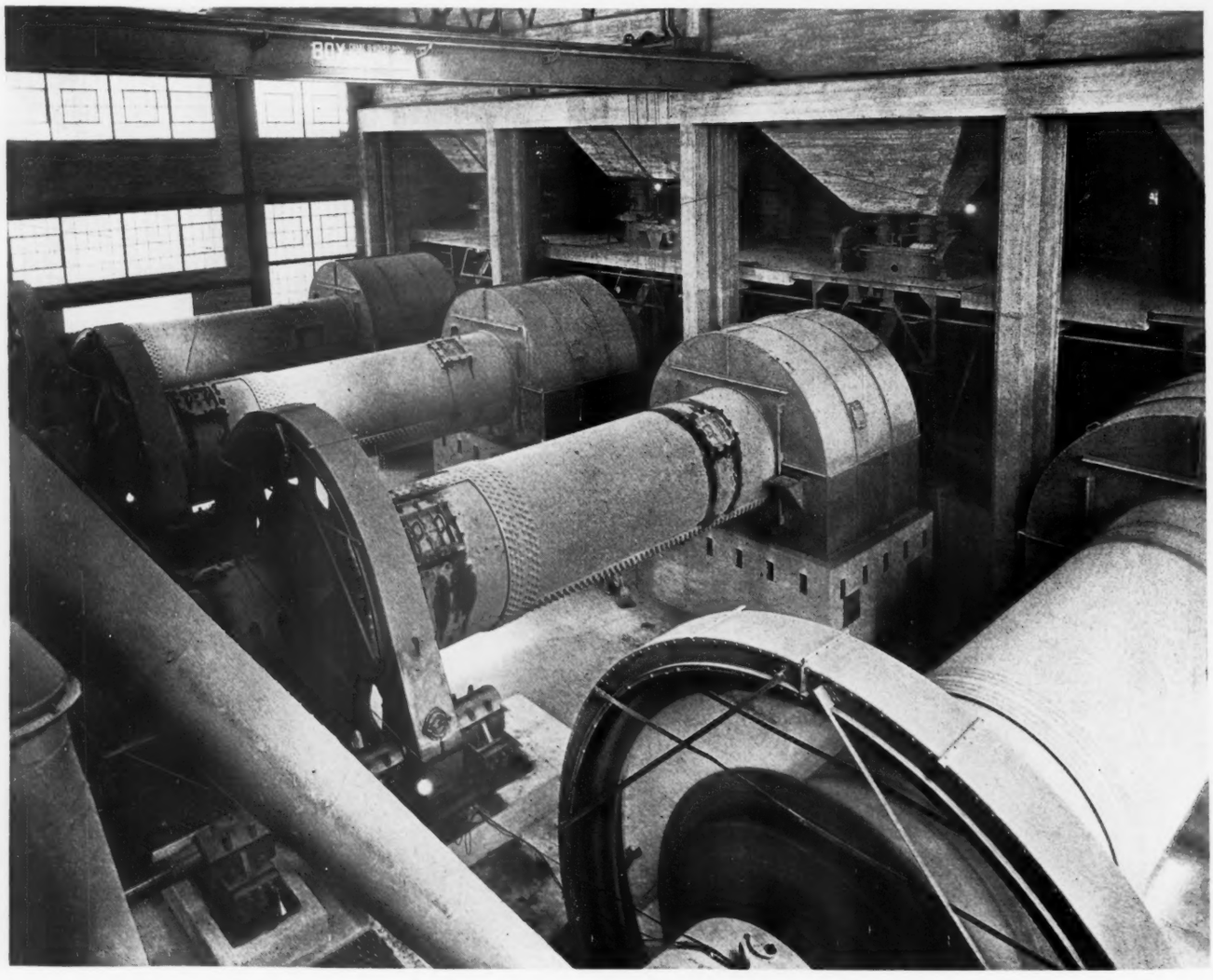
One of the grinding mills. The feeders in the background supply proper proportions of low and high lime rock

low lime rock, clinker and gypsum is 300 ft long by 70 ft. wide and is placed at right angles across the main axis of the plant between the coolers and the compeb mill feed bins. The total capacity is sufficient for 12 days' operation. The space is spanned by a 7½-ton Pawling and Harnischfeger crane with a 3½-yd. Williams Type P. F. bucket operating on a craneway 61½ ft. above the bottom of the clinker pit and 13 ft. above the bins. The crane is operated by two 50-hp. hoist motors, one 50-hp. bridge motor and one 15-hp. trolley motor, all on 440 volts. Normally, the raw bins will be kept filled by the belt conveyor and the crane will operate on crushed stone only when it is needed from storage. All the clinker and gypsum, however, will be handled by the crane. In order to equitably meter the crane power between the raw and finish grinding departments the crane trolleys are divided at the center and each side is fed from its respective department circuit.

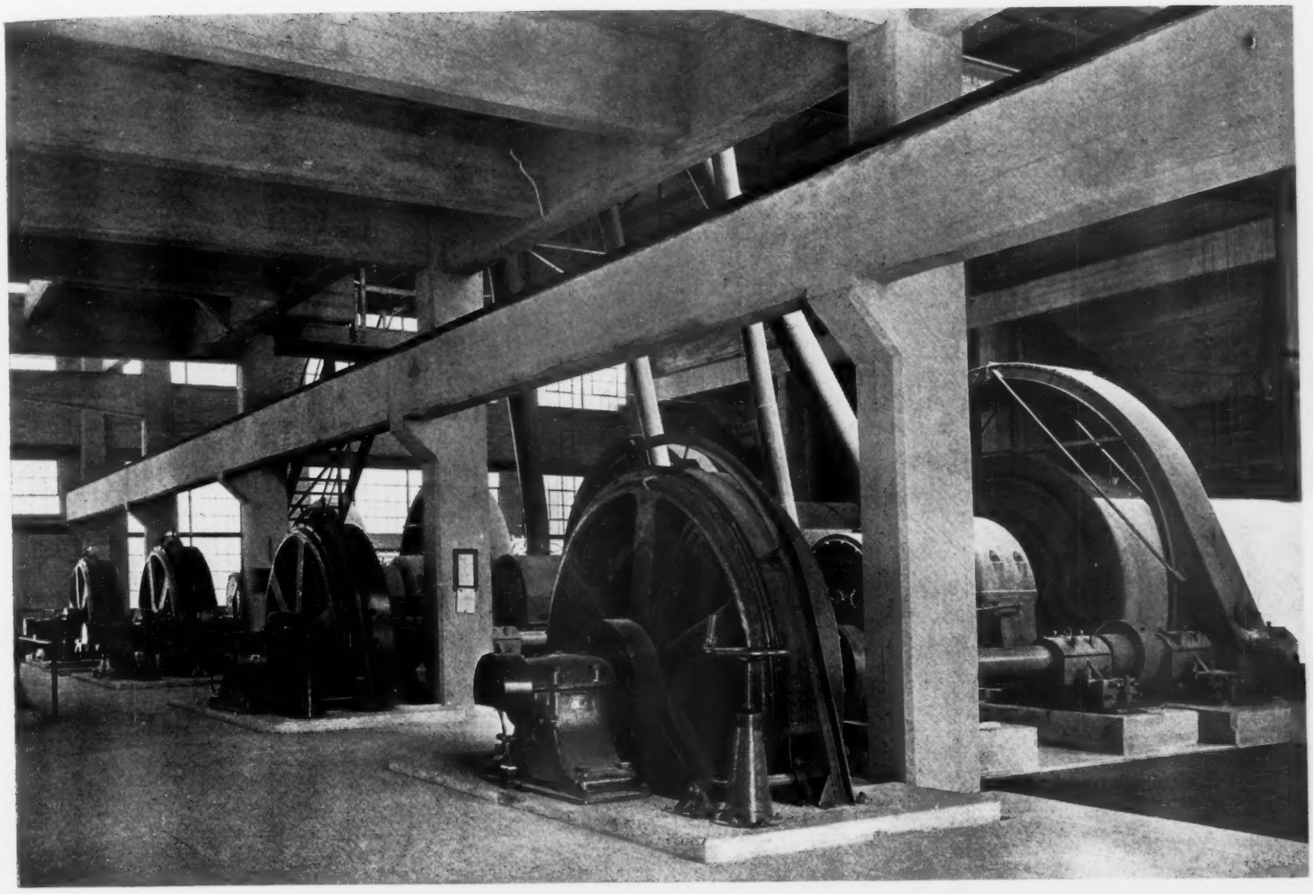


Clinker and gypsum feeder drives for the finish grinding mill

The four compeb mills are 40 ft. long and



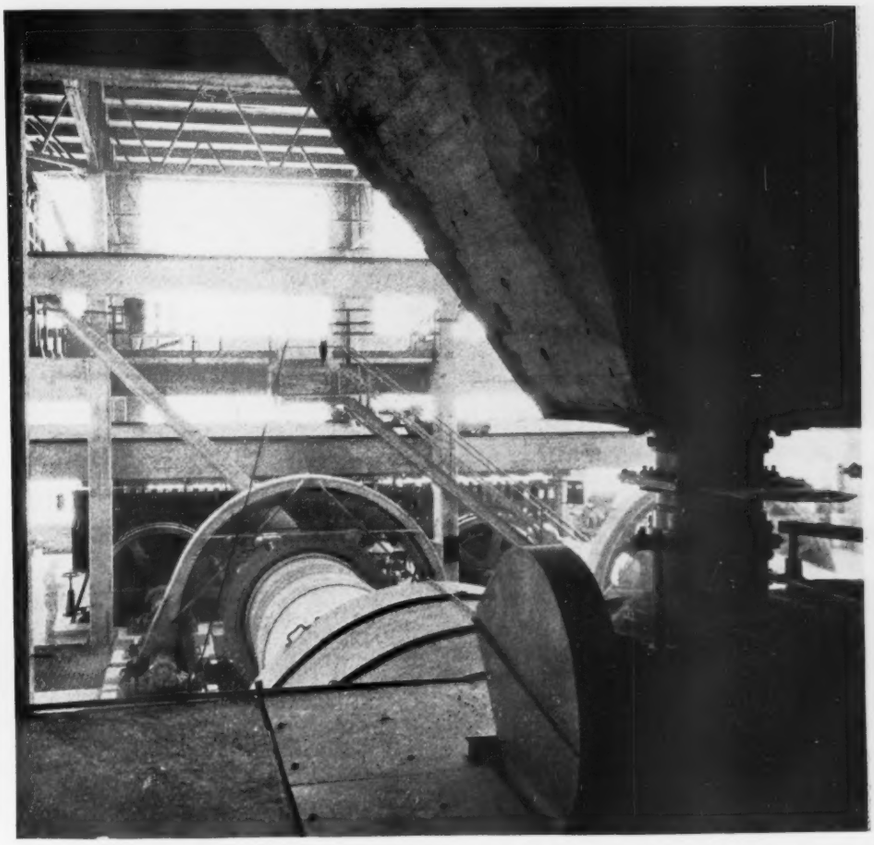
Looking down at the grinding department



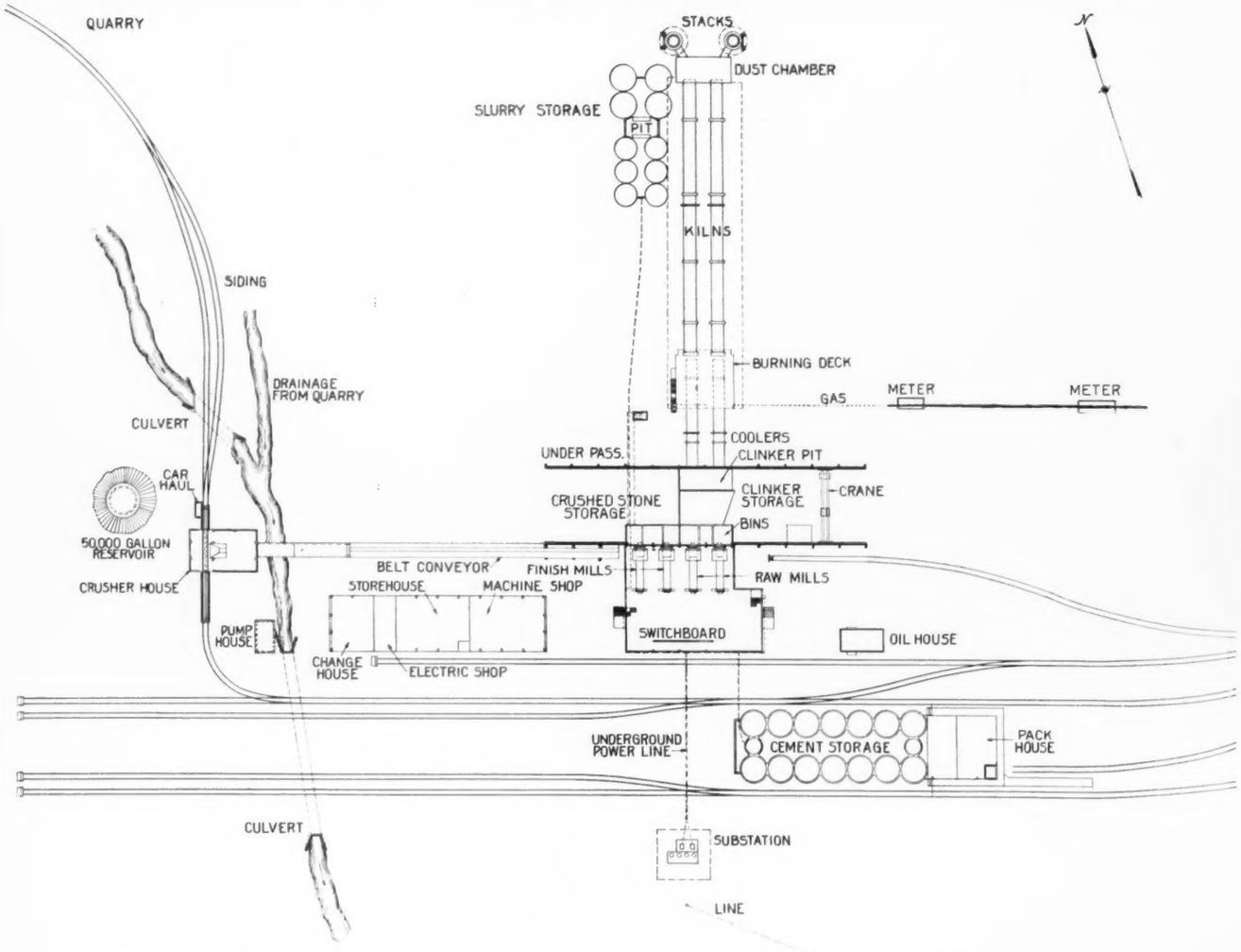
Raw and finish grinding mills and their 800-hp. super-synchronous motors

7 ft. in diameter for the most part, with an 8-ft. diameter portion near the feed end. They are driven by 800-hp. 180 r.p.m. 2200-v. super-synchronous motors through a single, spur-gear reduction. The motors are so constructed that the stator rotates at the start and is phased-in with the rotor stationary. Upon the application of the band brake to the stator frame all the pull-out torque becomes available to bring the rotor and mill up to speed while slowing the stator down to a standstill. The stators are started from the main switchboard in the mill room and the rotors and mills are brought up to speed by handwheels on the brakes at each motor.

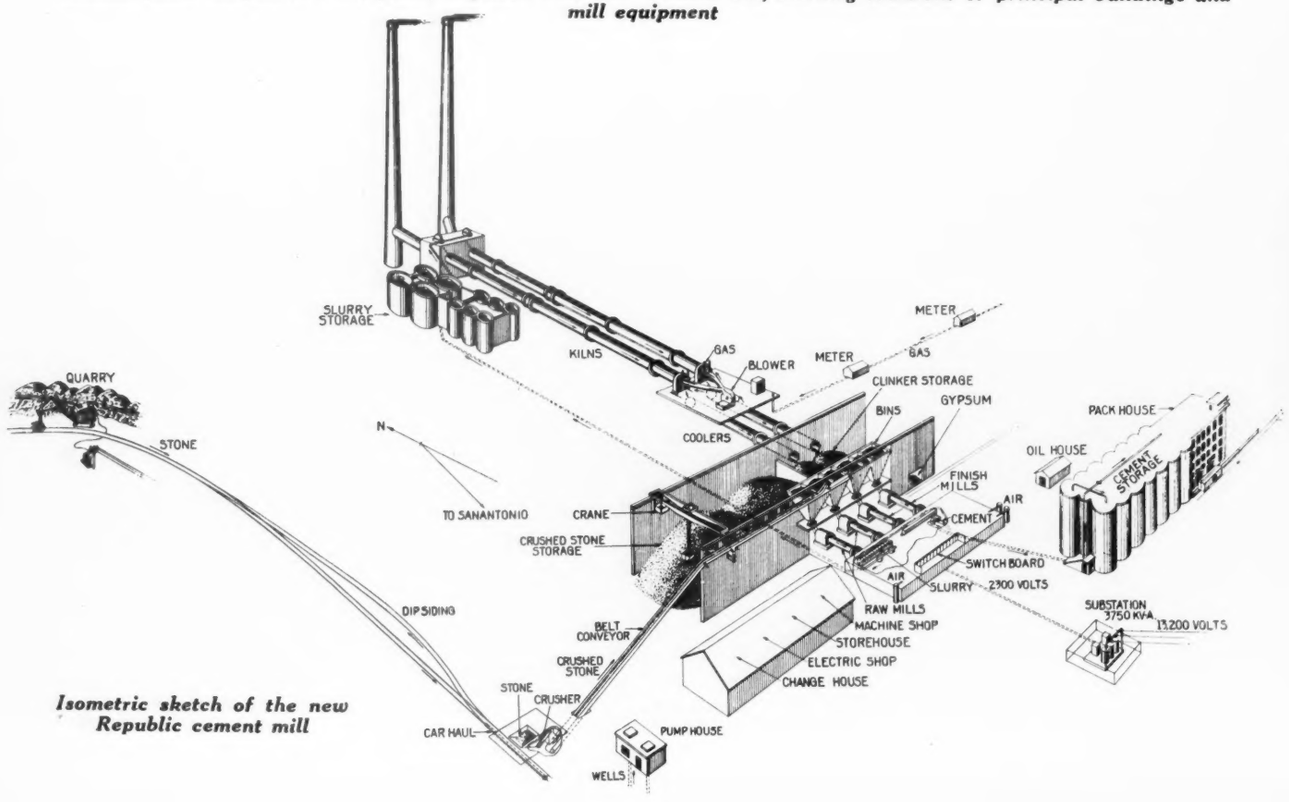
The mill feeding system is unique in that three separate bins serve each pair of mills. On the raw grinding side a large central "low lime" bin is flanked on either side by a "high lime" bin. The center bin is divided and feeds to both sides. The high and low lime rotary-table feeders are each driven by a direct current 5-hp. 600/1200 r.p.m. 230-v. motor to which is attached a small generator for indicating, by calibrated voltmeter, the speed of the feeder table. On the finish grinding side the small center bin contains gypsum to feed both mills with large clinker bins on either side of it. The two feed tables for each mill are geared together and are driven by direct-current, 5 hp. 450/900 r.p.m., 230-v. motors.



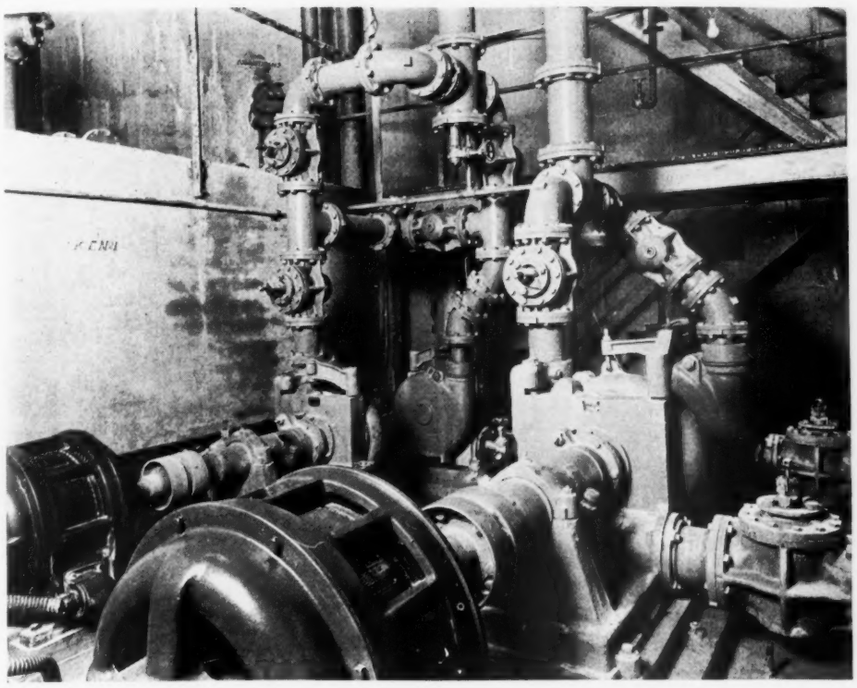
Clinker feeder, finish grinding mill, drive motor and main switchboard



Ground plan, Longhorn, Tex., plant, Republic Portland Cement Co., showing locations of principal buildings and mill equipment



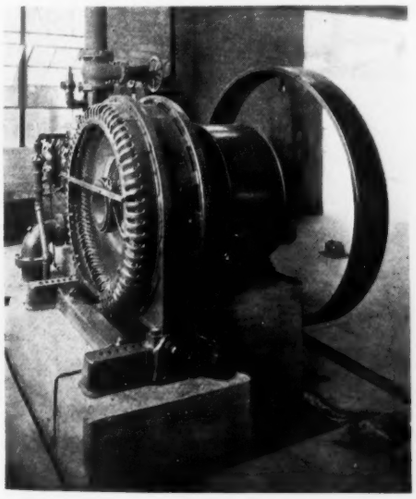
Isometric sketch of the new Republic cement mill



Slurry pumps in the pit

Slurry

The discharge from the raw mills goes to a horizontal receiving tank containing concentric right and left ribbon agitators, equipped with Timken roller bearings, which are driven by a 7½-hp. squirrel cage motor.

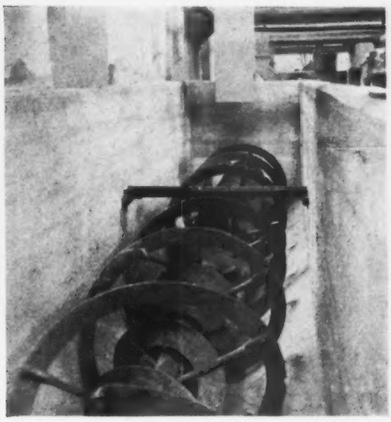


Synchronous motor drive of the compressor supplying air for slurry agitation

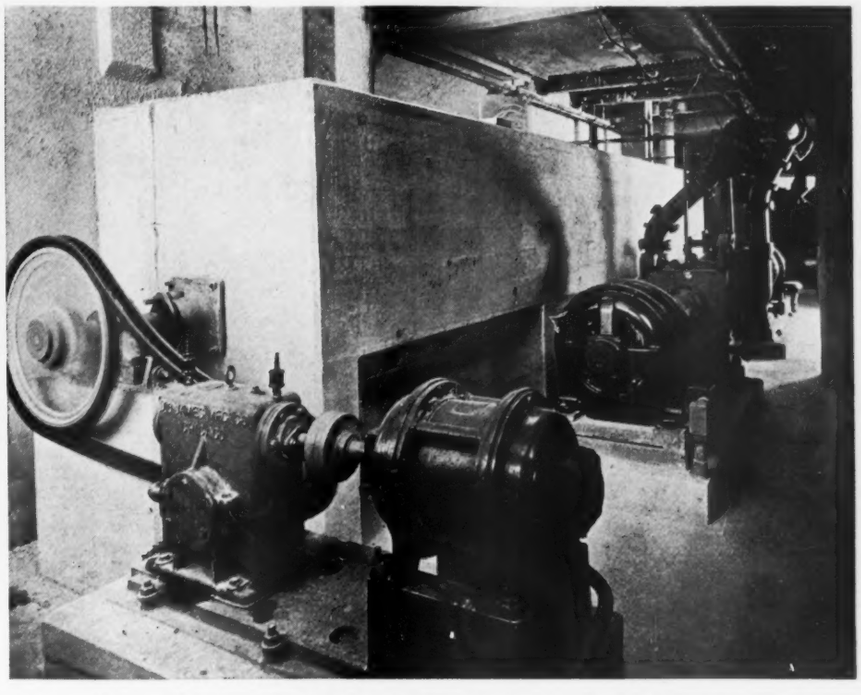
The slurry, with the high water content of 40%, on account of the colloidal nature of the chalk, is pumped by two 6-in. Wilfley centrifugal sand pumps to the slurry tanks. The squirrel cage pump motors are rated 75-hp., 1200 r.p.m. Intake and discharge lines from the pumps are all equipped with Merco-Nordstrom lubricated plug valves.

The slurry correcting tanks and storage tanks are located alongside the dust chamber. The four kiln feed tanks are 24 ft. in diameter by 30 ft. high, while the six correcting tanks are 20 ft. in diameter by the same height. The six reinforced concrete blending tanks are arranged in two parallel rows of three tanks each, all of which discharge to a concrete sump which is served by the two 6-in. Wilfley sand pumps. The four reinforced concrete storage tanks discharge to a separate sump that is served by two 4-in. pumps directly connected to 40-hp. motors. The discharge lines of the 6- and 4-in. pumps are interconnected so that it is possible to make a wide variety of combinations of slurry for blending. The discharge lines and suction lines are all equipped with Nordstrom lubricated plug valves. The two sumps are provided with ribbon type spiral agitators similar to those used at the discharge of the raw mills.

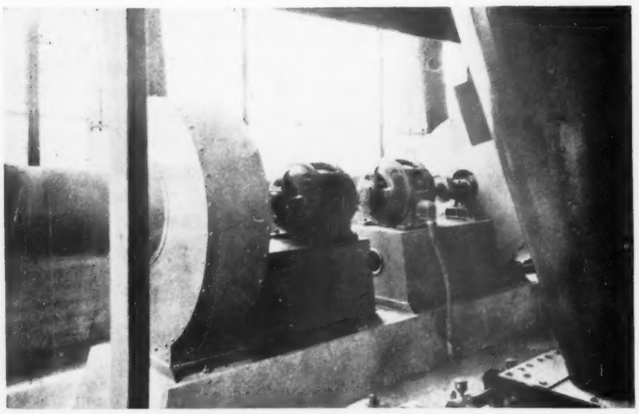
Between the two sets of tanks is the pump pit containing the transfer pumps and slurry feed pumps. On the platform at the top of the tanks are located the agitator drives. These consist of four 25-hp. squirrel cage motors driving through James herringbone gear reducers having 48:1 ratio. The controls for the agitator and pump motors are concentrated on a rack on the platform. The mechanical revolving agitators are supplied with air at 40 lb. gage by a compressor in the mill building. It is an Ingersoll-Rand,



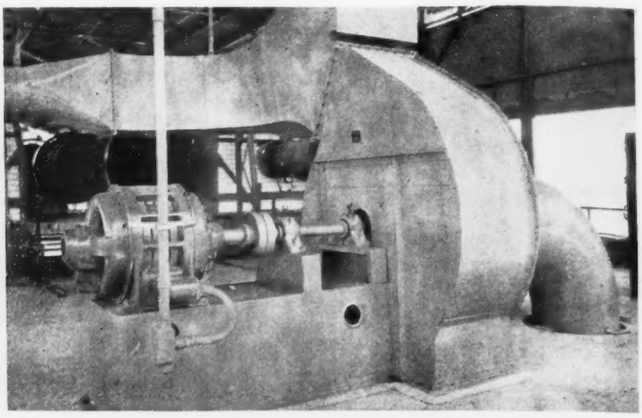
Slurry agitator in surge tank ahead of the slurry pumps



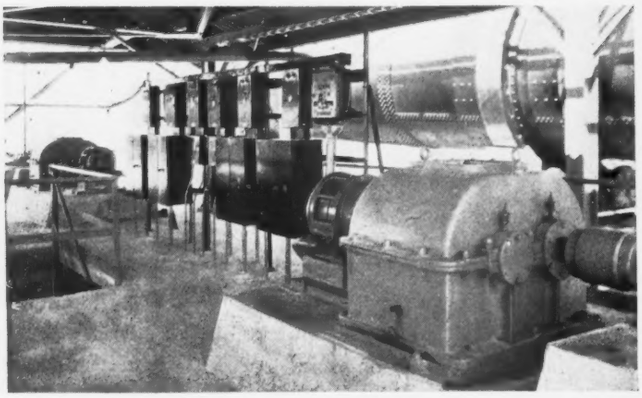
Motor drives on the ribbon agitator for slurry and the slurry pumps



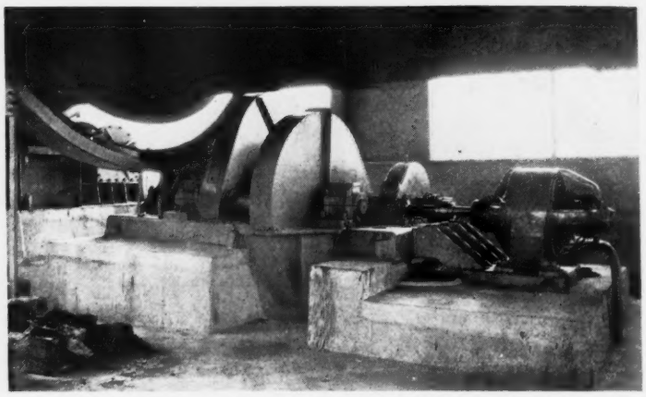
Motor drives of the dust collector fans



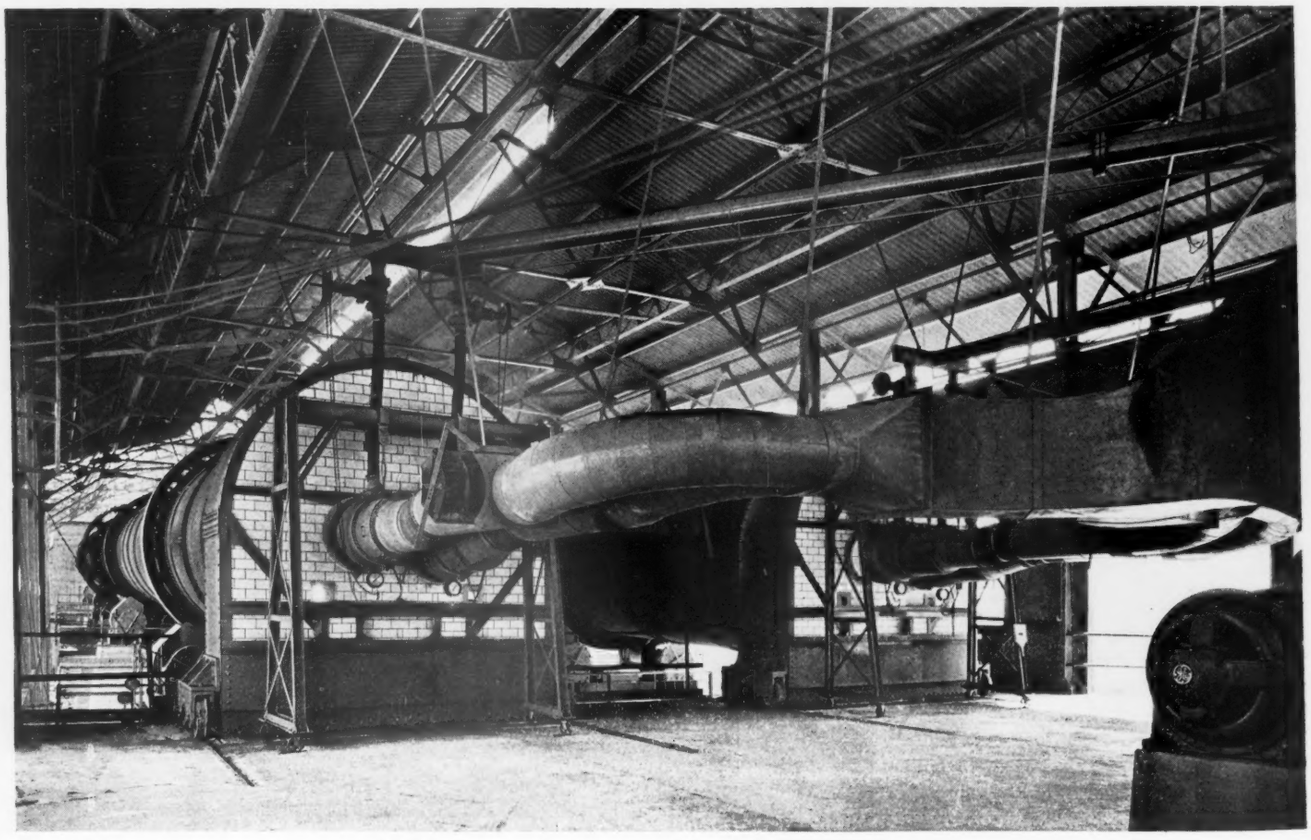
Fan delivering air to the gas burners of the kilns



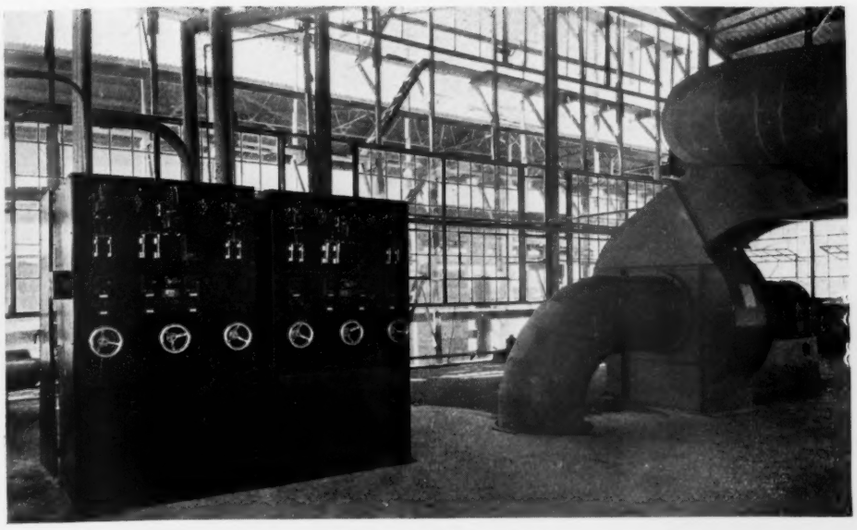
Two of the four motors driving the slurry agitators. Control rack for controlling motors, feed and transfer pumps



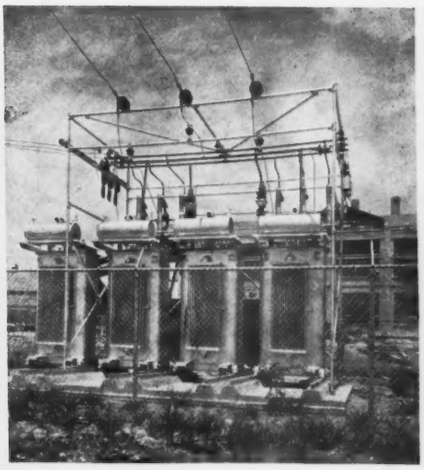
One of the two 75-hp., 600/1200 r.p.m. motors driving the rotary cement kilns



Firing floor, showing the air and gas ducts for the kilns



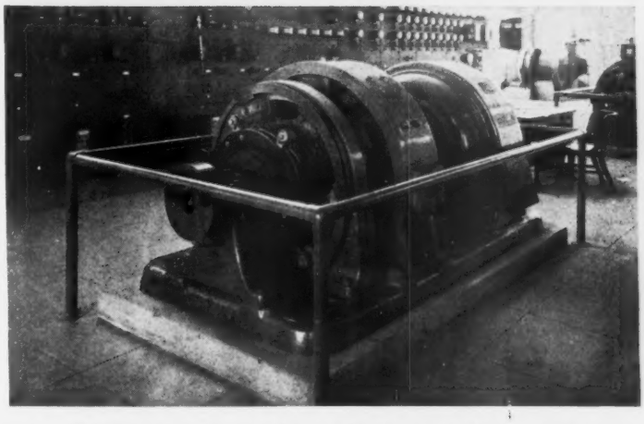
Kiln switchboard and fan



Transformer substation for the mill

Class ER-1, 17-in. by 12-in. compressor driven by a 100-hp., 257 r.p.m. synchronous motor of the overhung type. The slurry is fed to the kilns by "ferris" wheels driven by direct-current, 5-hp. 450/900 r.p.m., 230-v. d.c. motors through 900/34 James speed reducers. The controls for these motors are on the kiln firing floor.

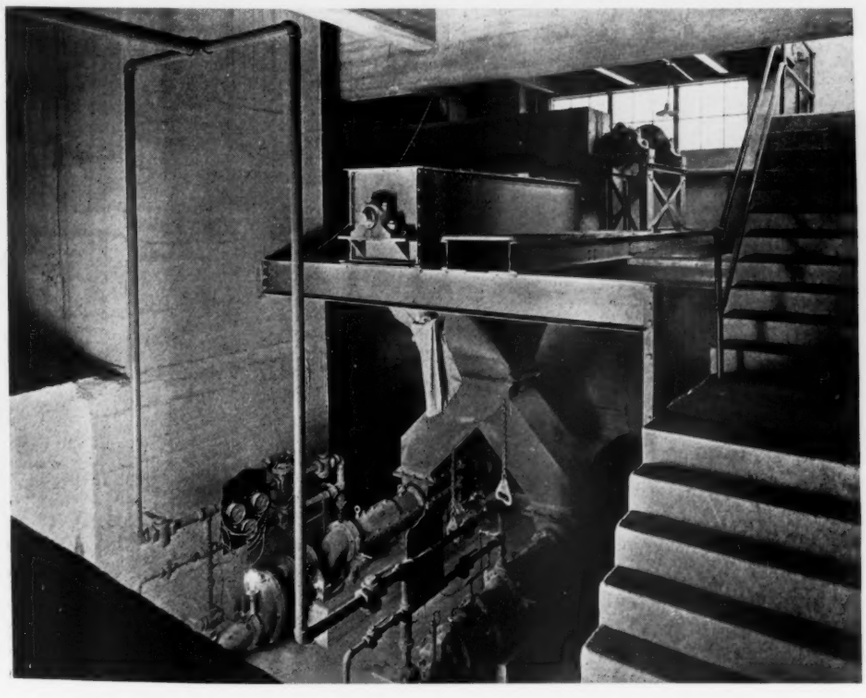
Tanks are provided with Meade agitators. These consist of a central shaft with three horizontal channel iron stirring arms. Two pieces of T-rail swung by chains from the lowest arm reach to within a few inches of the bottom of the tank and serve to keep material from building up on the latter. Air is carried down pipes fastened to the stirring arms to near the bottom of the tanks, causing "blowing" to occur over the entire area of the tank as the arms revolve. Air to the pipes is furnished through a short length of hollow shaft. The agitator is driven by means of the usual gear and has a lignum vitae step bearing. These agitators have proved most effective in giving a uniform mix and require but little power and air for operation.



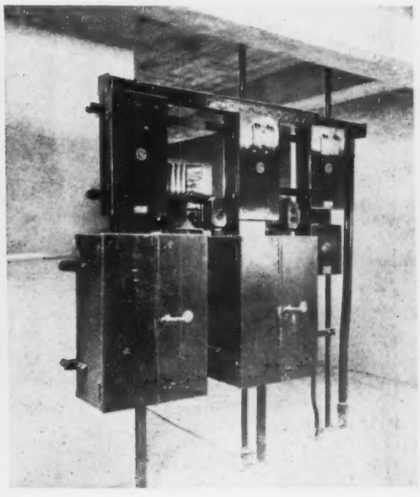
Motor generator set for excitation and d.-c. power

Kilns and Coolers

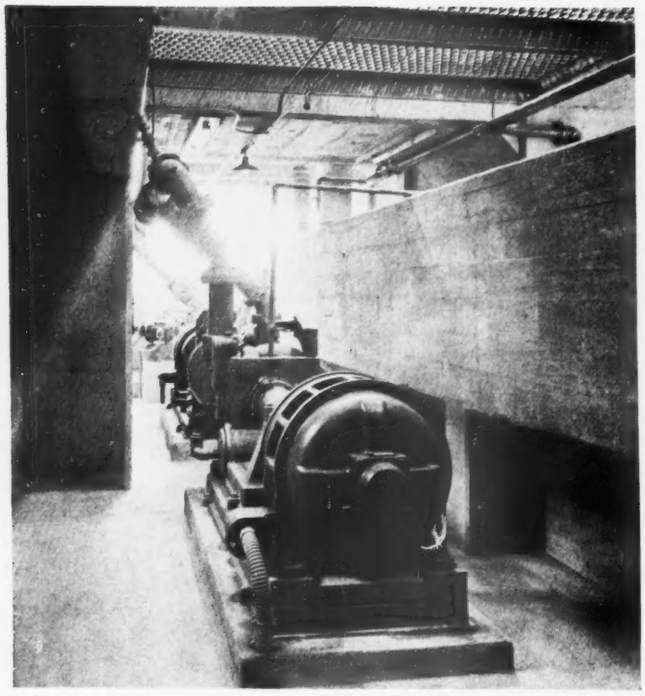
The two kilns are each 250 ft. long by 11 ft. in diameter, turning on four tires. The driving is done by 75-hp. 600/1200 r.p.m., 230-v. motors with control on the burning deck. The kilns are fired by natural gas from the Southern Gas Co.'s mains. It is



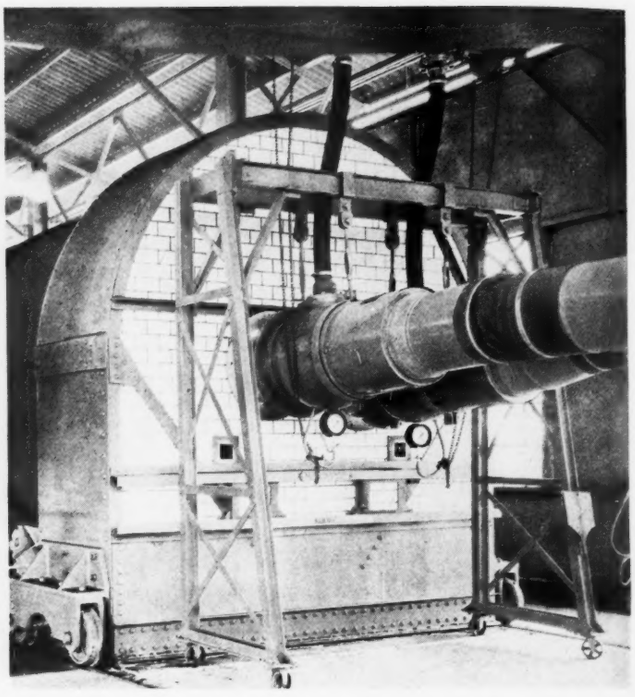
Screw feeders from finish grinding mills delivering finished cement to pneumatic pumps



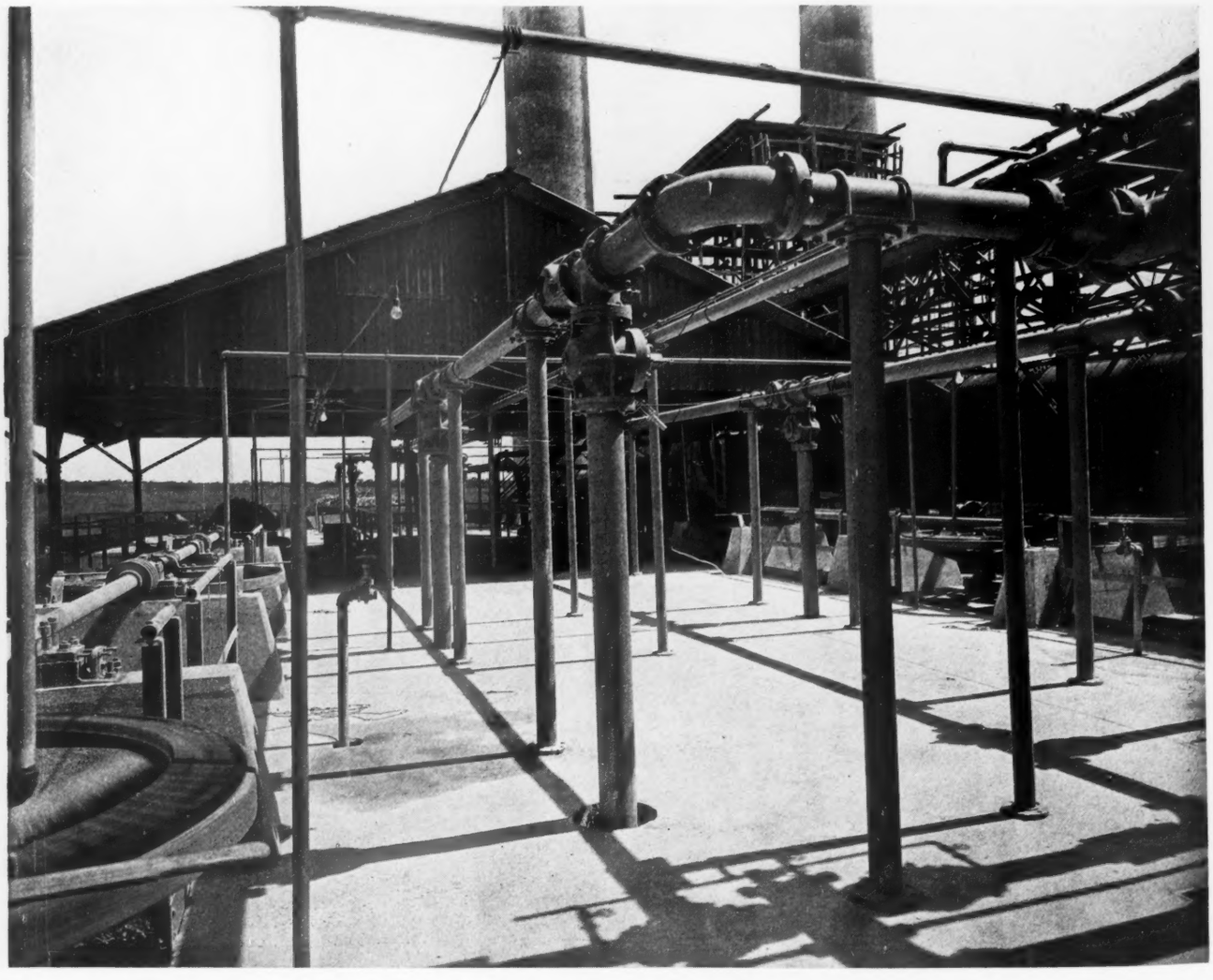
Control equipment for screw feeder and pneumatic pumps



Slurry pumps delivering slurry from raw grind mills to storage



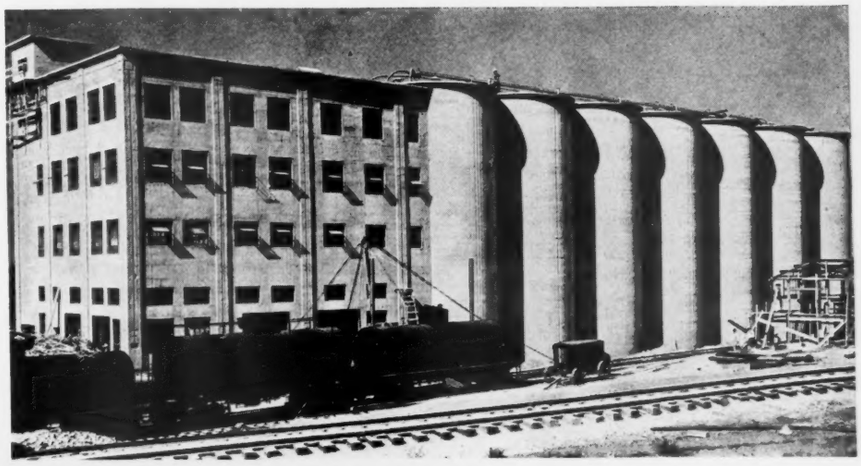
Firing end of the kiln, showing draft and fuel gages



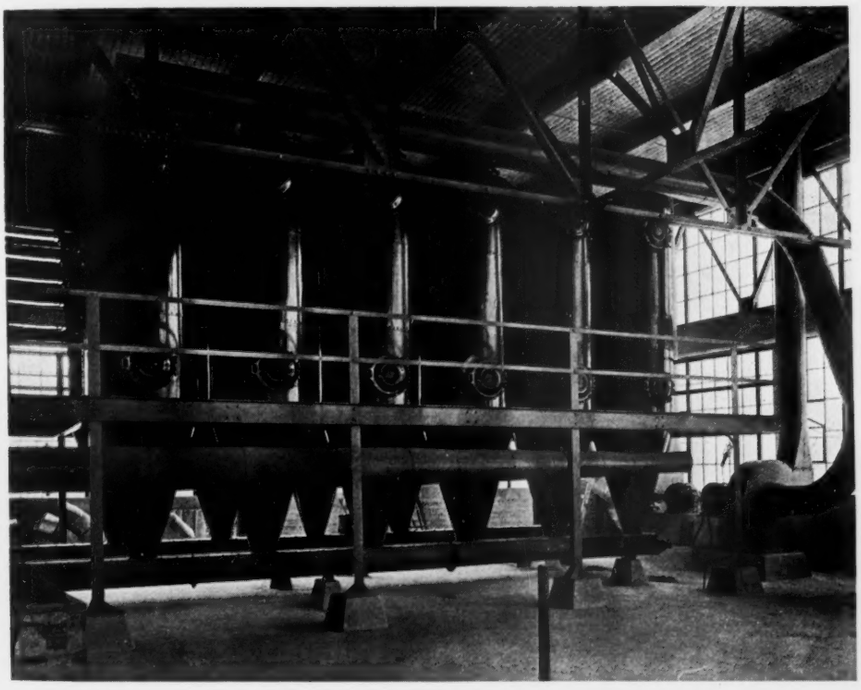
View on top of the slurry tanks, showing the feed lines and valves

received at 200 lb. and is successively reduced to 50 lb., 12 lb. and finally 6 oz. per sq. in. at the burner. Air is furnished at 180 deg. from over the coolers by a 90-in. Buffalo Forge Co. blower. A 100-hp. 900 r.p.m., squirrel cage motor is direct-connected to the blower. The air pipe is divided for the two kilns and again divided for two Tate, Jones and Co. gas burners for each kiln. Provision has been made for oil burning in case of a gas shortage. Leeds-Northrup instruments are used for recording temperatures and draft.

The concrete stacks are 200 ft. high with 9 ft. flues throughout. The base is 16 ft. in diameter and there is an air space between the concrete shell and the brick lining. The dust chamber is of concrete 25 by 50 ft. in area. The firing floor is remarkably clear



Pack house and storage silos



Dust collectors gathering dust from the finish grinding operations

of apparatus—the only prominent features are the blowers, the control panel and the overhead gas and air manifolds.

The coolers are 100 ft. long by 10 ft. in diameter and are driven by heavy-starting-duty, squirrel cage motors rated 50-hp., 900 r.p.m. The coolers discharge through the storage space wall to the clinker pit directly under the crane.

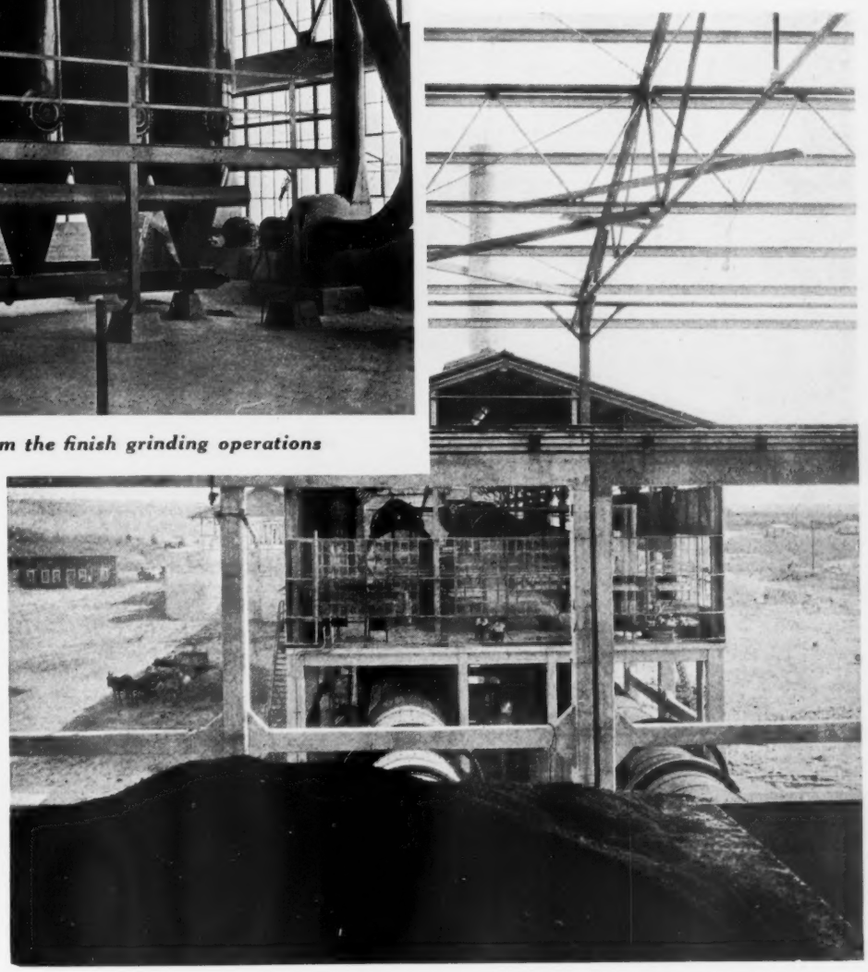
Cement Pumps

The two finish mills discharge to screw conveyors, thence to two Fuller-Kinyon, Style 6, Type E pumps. Air at 100 lb. gage is supplied by two compressors in the mill building. They are Ingersoll-Rand, Type XRE, compound units with 11-in. and 18 in. by 14 in. stroke cylinders. They are driven by 175-hp., 257 r.p.m., 2200-v. synchronous motors of the built-in type.

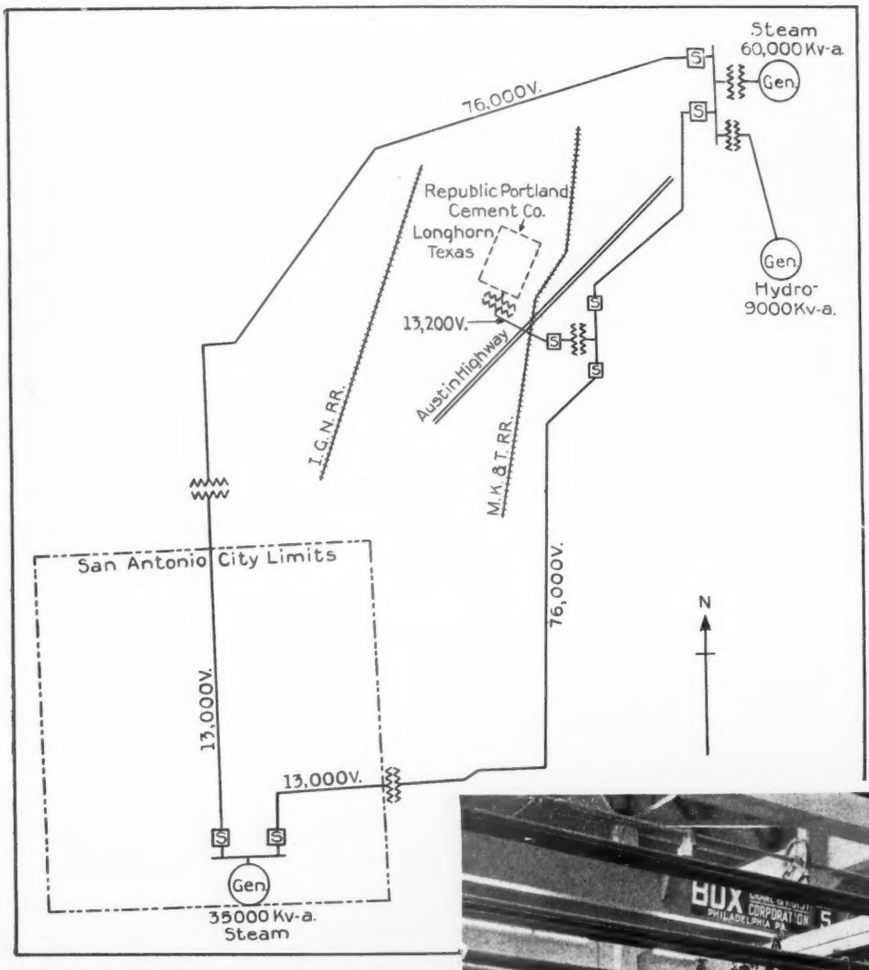
A system of Northern Blower Co. dust collectors located on a mezzanine floor over the compressors collects dust from the finish grinding system. The principal motors are two 20-hp. squirrel cage units driving blowers.

Cement Storage and Pack House

The cement storage consists of 14 large and two small silos, which with the interspace provides for 150,000 bbl. storage. Ce-



View over the clinker and gypsum bins showing the kiln buildings and coolers. The slurry tanks show at the left



Power transmission system supplying the plant

ment is fed into the tops of the compartments by pipes from the Fuller-Kinyon pumps. There are three lines of screw conveyors under the silos and interspace for conveying cement to the packhouse. Four Bates 4-spout valve-bag sackers are used to fill the cloth or paper bags in which the cement is shipped. Ample provision has been made for shipping by rail and truck. An Otis elevator serves the various floors of the pack house which contains storage space, bag cleaners and other equipment.

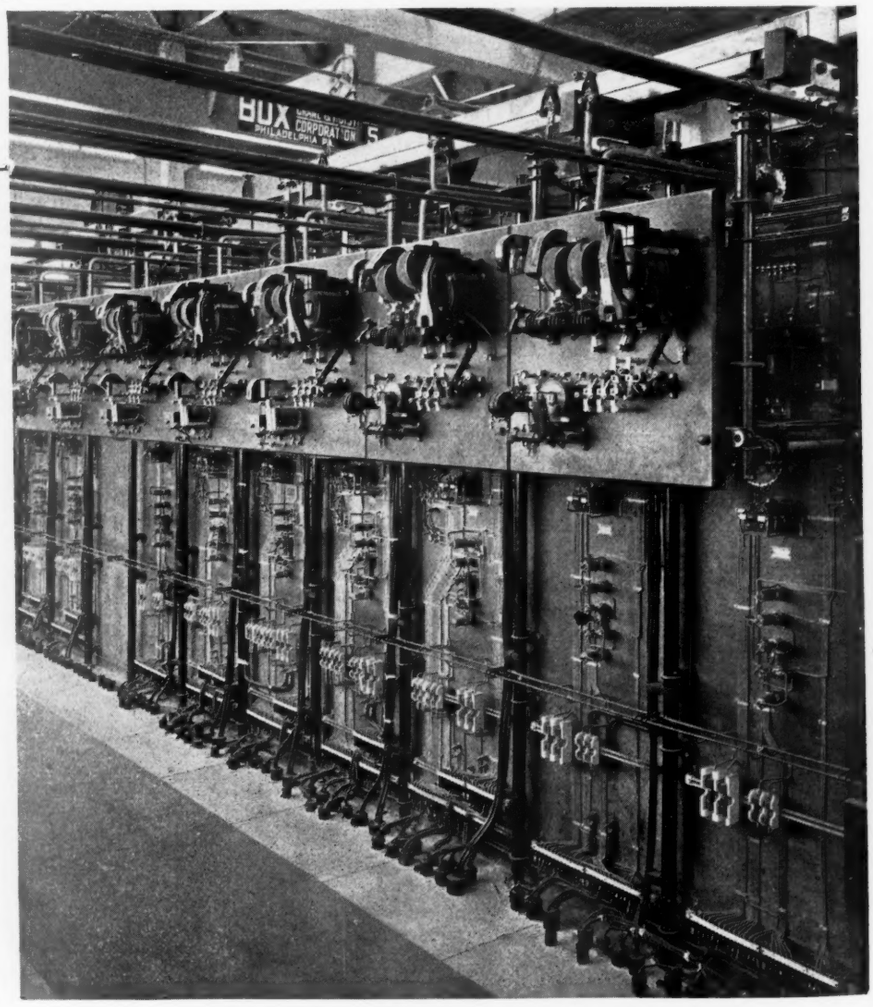
Trackage facilities are unusually ample, providing empty car storage for 30 cars on each side of the packhouse, equal loaded car storage and special run-around tracks and bag house tracks enabling switching to be carried on without interrupting the loading cars for shipment.

Electrical Data

Electric power is purchased at 2300 volts from the San Antonio Public Service Co., which has a 3750 kv.-a. 13,200/2300-v. substation at the plant. A four and one-half mile line connects with a 9000 kv.-a. substation on the 76,000-v. loop between San Antonio and New Braunfels. This loop is fed by a 35,000 kv.-a. steam station at San Antonio, a 60,000 kv.-a. steam station at New Braunfels and by a 9000 kv.-a. hydro-station at McQueeney. The substation at the plant is equipped with Moloney transformers and General Electric switchgear and structure details. Two underground lines lead into the plant through outside disconnects, 1200-amp. oil circuit breakers and inside disconnects. The breakers are capable of interruptnig a short circuit of 77,500 kv.-a. at 2300 v. There are three 3000-v. power distributing busses for raw mills, finish mills and general power. A 1200 kv.-a. bank of transformers furnishes a 460-v. circuit from the 2300-v. general power bus. Quarry and crusher house each have 150 kv.-a. banks of transformers for 460-v. circuits.

Plant lighting is provided for by three 37½-kw. transformers with automatic changeover to storage battery in case of failure of power. The principal function of the battery and its motor generator charging set is to provide power for tripping circuit breakers. A village lighting circuit is tapped off the 2300-v. general power bus.

The main switchboard is 49 ft. long and is made up of incoming line panel with meters, totalizing panel, 2300-v. general power feeder panels, 460-v. feeder panels, motor



Back of main switchboard at power distributing end

generator control panels, raw and finish mill panels, etc. In the basement below the switchboard is a neat and roomy installation of oil switches and general switchgear, compensators and transformers.

An "Edmoore Demand Limitator" is installed on the main switchboard. It functions, by dual control, to limit both short duration peaks and integrated demand. By means of electric unloading valves, the three compressor motors aggregating 450 hp. are unloaded one at a time until a threatening peak is headed off. Should any compressor be shut down, the "Limitator" automatically acts upon the remaining ones in order. Should the demand, say over 12 minutes, indicate that the 15-minute demand will exceed the predetermined amount, the device stops an 800-hp. raw or finish grinding mill motor, and a second one if the load still persists. By means of a switch, the motors in the grinding department having the most stock ahead can be selected as the tempering units. It is believed that the device will save thousands of dollars per year in demand charges and kilowatt-hour costs without interfering with production. It was furnished by Edward T. Moore, manufacturer, Syracuse, N.Y.

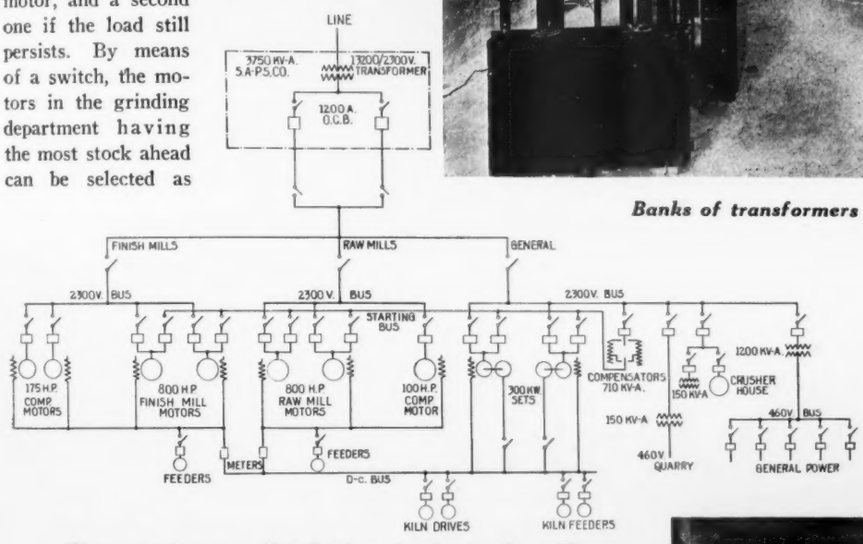


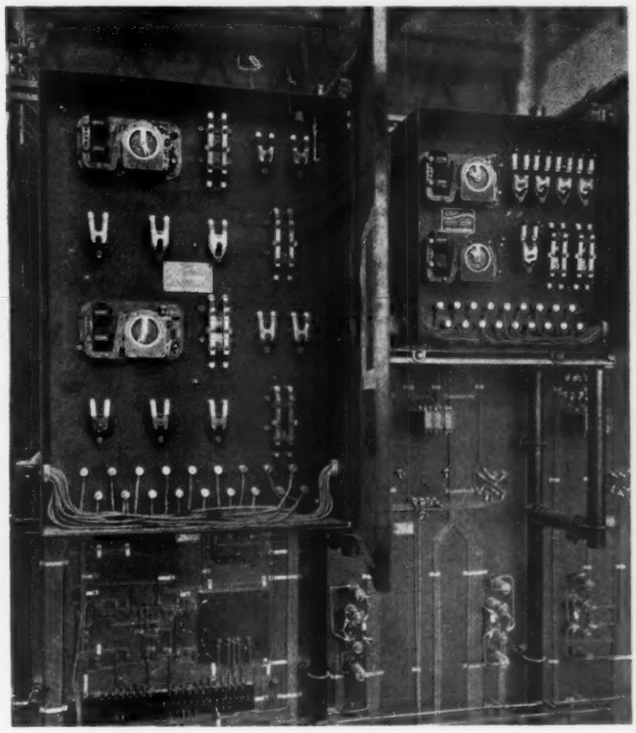
Diagram of power distribution circuits in the mill

Banks of transformers under the mill building

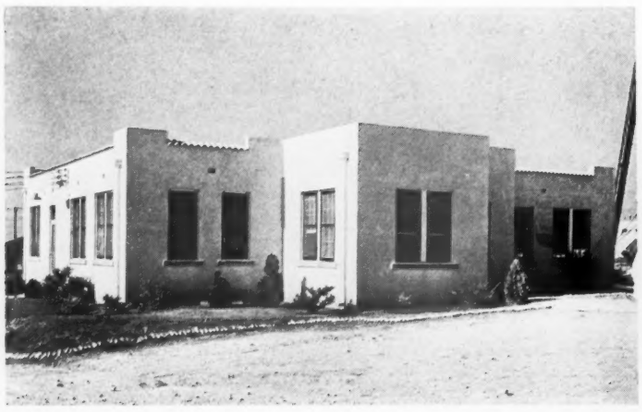
through Falk-Bibby couplings or are geared through D. O. James geared speed reducers. In many cases Link-Belt chains are used beyond the gear reducer. The mill lighting system utilizes 100- and 200-watt lamps in Ivanhoe metal reflectors. No provision has been made for emergency operation of kilns because the three stations and loop connections practically preclude more than momentary outages especially as lighting disturb-

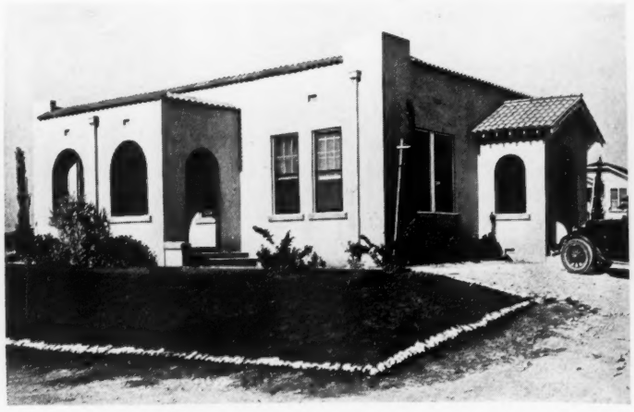
Trademark and brand on one of sacks

All the squirrel cage motors in this plant are started across-the-line. This is also true of the 275-hp. and 100-hp. compressor synchronous motors. Time limit overload protection is provided for every motor. Push buttons and magnetic starters are used wherever applicable. The unity power factor will be maintained through the leading power factor synchronous motors. All motors are direct-connected



Control panels showing auxiliary relay equipment for demand limiter on back of switchboard





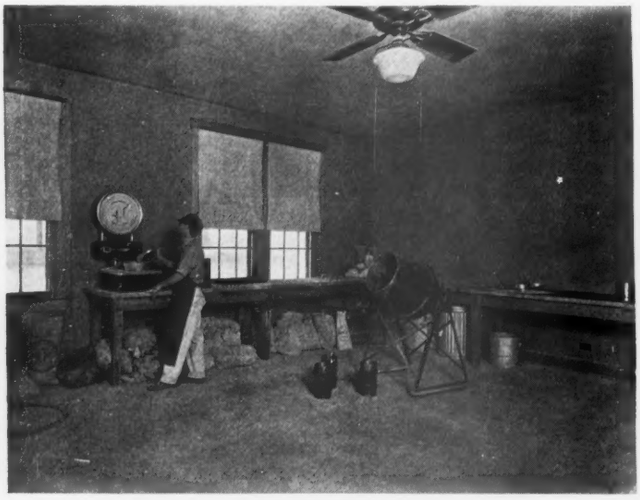
Laboratory (left) and office (right) of Republic Portland Cement Co.

ances are very rare in this region. The grinding mill is served by two hand-operated Box cranes, one of 5 tons capacity over the supersynchronous motors and compressors and a 10-ton unit over the mills. The crusher house has a 10-ton similar crane.

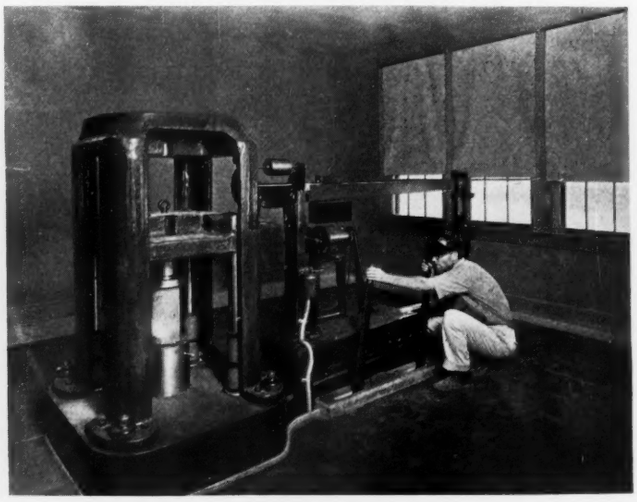
A large building between the crusher house and mill building includes a machine shop, equipped with modern machine tools, and a 400-amp. portable arc welder, a storehouse, the electrical shop and three change rooms for the employes. An oil house is located east of the mill building. Over the gas line are two meter buildings—the outer one houses the Southern Gas Co. meter and valves for reducing the gas pressure from 200 to 50 lb. The other contains the company's meters and reducing valves for 50 to the 12 lb. pressure for the kiln mains.

Personnel

The officers of the company are: J. H. Smith, president; W. M. Thornton, vice-president and manager; B. R. Collins, secretary; L. O. Cox, sales manager; A. F. Sayers, superintendent; G. P. Horn, chief chemist. General offices are maintained in the Smith-Young Tower, San Antonio.

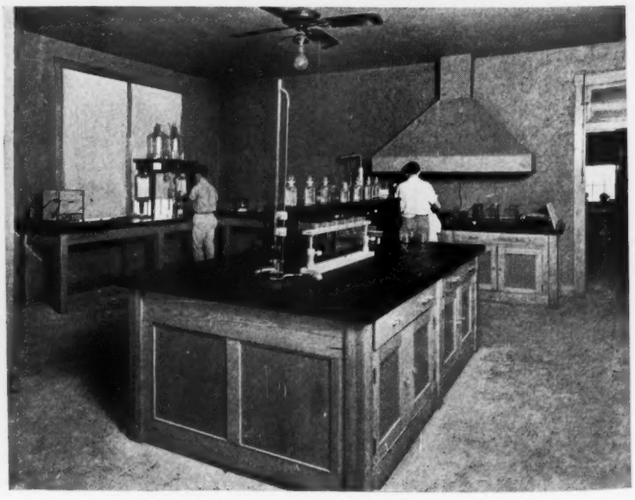


Preparing samples for physical testing



Carrying on a breaking test on concrete cylinders

Troughs for water-curing of cement specimens



A section of the laboratory devoted to chemical testing

Dredge and pipeline at the deposit

Looking down at the dredging pond

Economical Silica Sand Plant in New Jersey

J. B. Drinker and Co., South Vineland, Adopts Modern Dredging and Classifying Practice to Increase Production Greatly

THE SOUTHERN PART of New Jersey has long been famous for its splendid deposits of silica sand. This sand is used very extensively in the making of glass, potteries, tile, plaster stucco, steel and iron molding and cores for foundry work, filter sand and sand blasting. The varied markets and extensive deposits have been responsible for the large number of plants producing this material and naturally competition is keen between producers.

Shipping Radius of 350 Miles

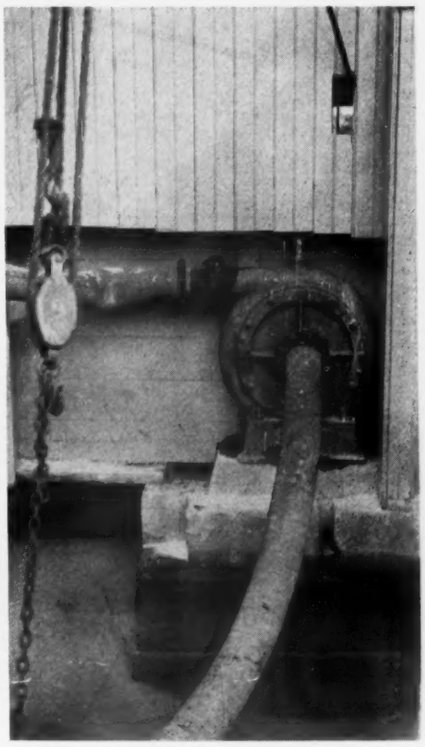
J. B. Drinker and Co. is quite fortunate in having a very high grade deposit at South Vineland, N. J. The sand produced at this plant is remarkably clean and free from foreign materials such as ilmenite, mica, magnetite and other oxides of iron such as are found in some deposits. The finished product is all minus 28-mesh and analyzes 99.5 to 99.75% silica. Due to the excellent quality of its sand, J. B. Drinker and Co. is shipping the finished product to various customers within a radius of 350 miles from South Vineland.

For five years the plant was operated on a small scale and enjoyed a class of business that kept it going to capacity all the time. Two horses were used to haul sand from the pit in one-yard dump carts to a tipple where it was fed into two log or screw washers, 24 in. dia. by 18 ft. long, and discharged on to a belt conveyor which carried it to the stock pile, where it dried and was loaded for shipment.

A steady increase in business and the desire to produce better materials led the Drinker company to investigate other methods of producing and handling silica sands. After studying various methods they decided to dredge their deposit and eliminate the expense of hand loading in the pit.

Dredging 15 Ft. Below Water Line

The dredge barge is 18 ft. long by 12 ft. wide by 2 ft. deep. A plain suction is used, as the material is loose and requires little agitation. Material is excavated to a depth of 15 ft. below water line and the bank is about 15 ft. above water, giving ideal conditions. The silica sand is picked up by a 4 in. belted Georgia Iron Works pump driven by a 30-hp. General Electric Co. motor. All motors used in this plant are General Electric 3-phase, 60-cycle, 440-v., 1200 r. p. m. The pipe line extends 300 ft. back of the boat and is 4 in. Naylor spiral pipe with flanged ends. The first pump discharges 15 ft. above the water into a box, 2 ft. by 3 ft. by 2½ ft. deep, which feeds a 36 in. by 6 ft. revolving screen. This screen was built at the plant of 16-mesh brass wire and is driven at 35 r. p. m. from a countershaft. Material coarser than 16-mesh passes out the end of the screen and returns to a settling pond with the water from the plant.



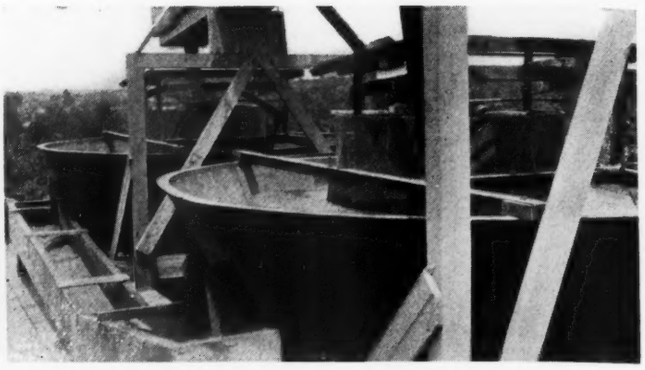
Centrifugal pump elevating material to the cone classifiers

The sand and water which passes through the 16-mesh cloth drops into a concrete sump, from which it is picked up by a 4-in. belt-driven Morris pump. This pump runs at 1100 r. p. m. and is driven by a 40-hp. 1200 r. p. m. General Electric squirrel cage motor and discharges the sand and the water 55 ft. above the pump through 110 ft. of 4 in. wrought iron pipe into a box 2 ft. by 3 ft. by 2½ ft. deep, similar to the one ahead of the screen. From this box, which acts as a surge tank and provides a uniform feed, a launder leads to two 6-ft. Allen cone classifiers and dewaterers.

Cone Classifying of Sands

The discharge from the surge tank to the two Allen cones consists of approximately 580 g. p. m. of water with 15% to 17% solids. The clay, silt and other objection-

Sand discharged from the cones is ready for shipping



Top of the classifier structure showing the two 6-ft. cones

able matter is carried out the overflow to waste along with the water. The settled sands are discharged from the bottom of the cones on the stock pile below. Between 30 and 40 tons per hour of settled sand are handled by the two cones.

When the structure supporting the cones was built, provision was made for rewashing in a second set of Allen cones, so arranged that the discharge from the first cones became the feed for the second ones, together with sufficient clean water to remove all foreign matter; but this was found unnecessary.

The sand from the cones drops to the ground and is loaded by hand on a Ford truck with a 1-cu. yd. body and is hauled to the railroad, about 300 yards from the plant.

Water for priming the pumps and for general service is obtained from a 3-in. well, 111 ft. deep. A 6 by 6-in. Myers "Bull Dozer" reciprocating pump driven by a 5-hp. 1200 r. p. m. General Electric squirrel cage motor forces the water into a 1200-gal. wooden storage tank. The 5-hp. motor also runs the countershaft from which the 16-mesh revolving screen is driven.

Stripping is done by steam-shovel and by hand and the material is loaded on the horse-carts and hauled to another section of the property.

With the old method of excavating materials using horses and carts, six men and two horses were employed and produced 70 to 80 tons per day. Since the installation of the dredge and other equipment, two men and the superintendent produce 30 to 40 tons per hour. Due to the increased capacity of the plant, it is not necessary to operate continuously and the men load the cars for shipment and strip when the plant is not running. This extra capacity insures a comparatively dry sand and permits the company to maintain a stock pile of 1200 tons at all times.

The old equipment is still in place

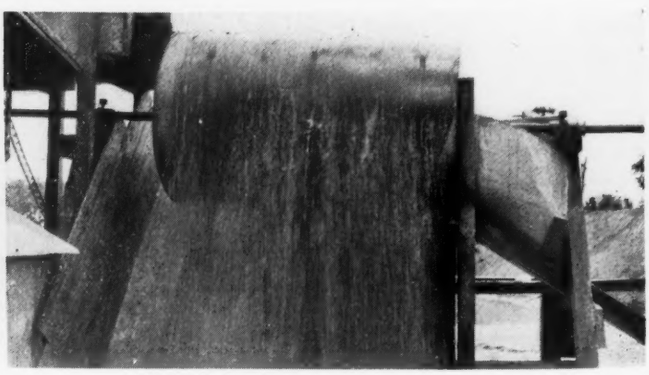
The main office of J. B. Drinker and Company is located at 1700 Walnut Street, Philadelphia, Penn. J. B. Drinker is president of the company, R. F. Wood, Jr., is manager of the various plants and Pete Giordano is superintendent of the South Vineland plant.

Chemical Bibliographies

THE NATIONAL Research Council announces the publication of its Bulletin No. 71, which is the first supplement to the bibliography of "Bibliographies on Chemistry and Chemical Technology," covering principally the period 1924-1928, Bulletin No. 50 having covered the period 1900-1924. This supplement contains approximately 4100 bibliographies classified under 1050 headings. The original bulletin (No. 50) contained approximately 10,000 bibliographies classified under 2400 headings.

Copies of Bulletin No. 71 may be obtained from the publication office, National Research Council, B and 21st streets, N. W., Washington, D. C., for $1.50 a copy.

Home-made rotary screen, 36 in. by 6 ft., covered with 16-mesh brass wire cloth

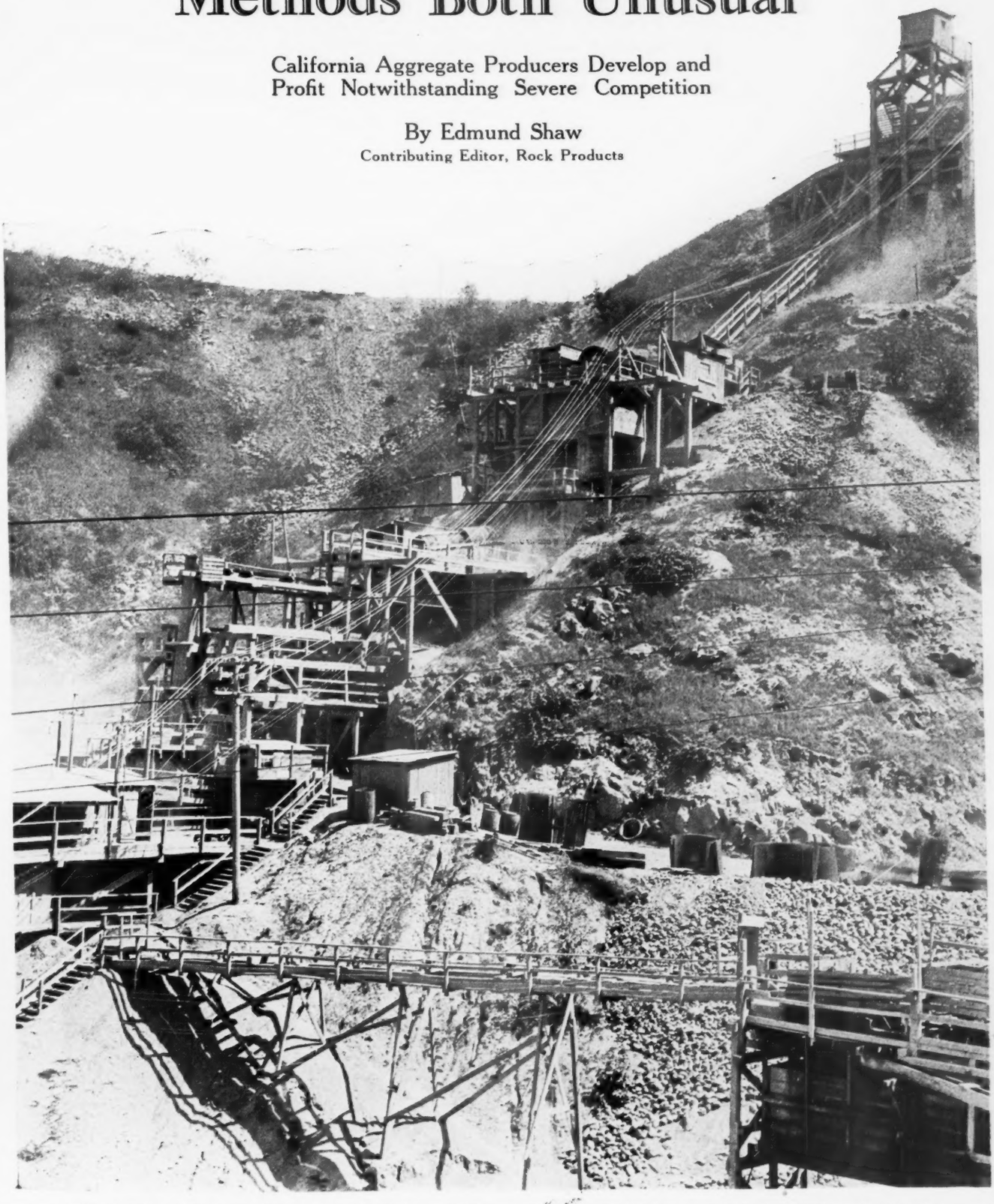


The rotary screen in operation. Oversize, a negligible quantity here, goes back to the pond

Graham Brothers—Plants and Methods Both Unusual

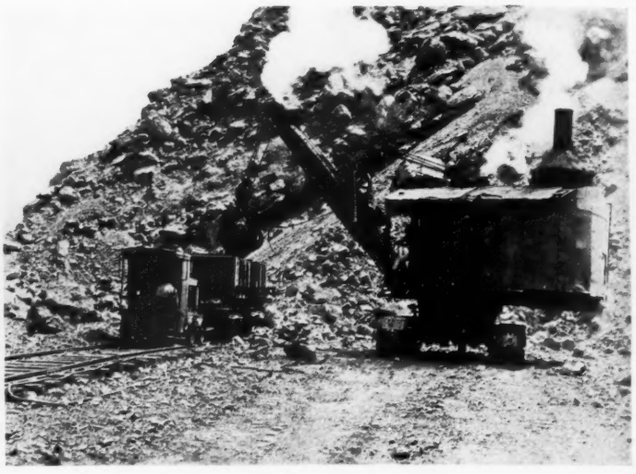
California Aggregate Producers Develop and Profit Notwithstanding Severe Competition

By Edmund Shaw
Contributing Editor, Rock Products



The Catalina Island crushing plant of Graham Brothers—the largest side-hill operation in Southern California

Partial view of the quarry face of 526 ft. height

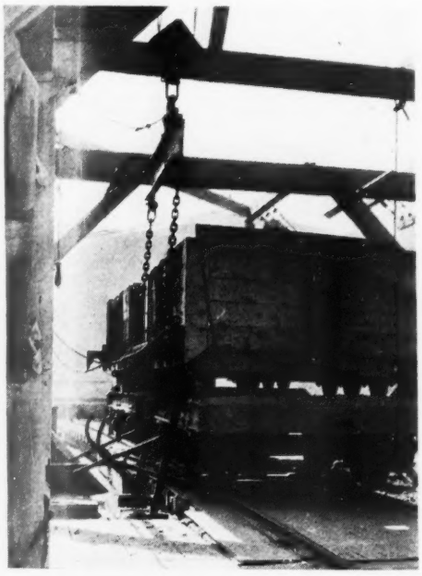


One of the shovels loading to quarry cars

EVERYONE who knows much about the rock products industry on the West Coast knows something of the Graham Bros. quarry and crushing plant on Catalina Island, off southern California. Thousands of tourists have seen it on the "skyline" drive around the island and recorded its unusual appearance with their kodaks. Many descriptions of it have been published The best of these, in ROCK PRODUCTS for February 23, 1924, by Edward C. Barkstrom, engineer, Stephens-Adamson Manufacturing Co., who designed the plant, has been many times reprinted and abstracted, not only in American but in French, German and English journals. One reason for this is that the plant is of a type which was novel at the time it was built. Since that time similar plants have been built, some of them among the most notable crushing plants in the country.

The reader is referred to the article mentioned for such details as conveyor lengths and widths and motor drives, for they are all given there in great detail and they have not changed. This article is confined to a description of a more general sort, concerning itself with some of the features of operation and management, and the changes that have come from the demands of a growing business.

The business has grown steadily from its inception. A short time after the plant was completed a large storage and distributing station was established at Long Beach. Next a sand plant at Lomita was added. And now to supply an ever-increasing demand for coarse aggregates a sand and rock plant is being built by Graham Bros. near Orange, Calif.



Car in position for dumping

It is usual for rock products industries to grow, of course, but not many of them can show such a growth as this under similar conditions. For the rock and sand business in southern California has been declining steadily during the past three or four years. Building has slackened and competition of the cut-throat kind has had to be met. The normal production of the district is about 12,000,000 tons yearly, but it has fallen slowly to something like 8,000,000 tons at the present time. One price war has followed another until, about a year ago, producers told the writer frankly that they did not know what the real purchase price was. Dozens of plants closed down, and while new and important plants were built by the larger companies, they were built because only heavy tonnage and the most economical methods of preparing and handling the prod-

Looking down on the plant and wharf conveyor

Car dump over the primary crusher

uct would permit a business to live—to say nothing of making a profit.

Under these circumstances the growth of this business (which has to quarry its raw material with drilling and explosives instead of picking it up loose with steam shovels) is indeed remarkable. It shows conclusively that there was intelligent management, but it also shows that a superior product was made and sold as a superior product, and that the service that went with it was one that its customers valued highly. And even a cursory study of the operation and a visit to the plant confirms these conclusions.

Below — Lower plant unit housing a jaw crusher and screens

Above — Bin receiving fines from the lower screening unit

The quarry on Catalina Island is about two miles from Avalon, the place which the "mammy song" makers and the railroad folders have made so well known. Twenty-two miles of open sea separates it from the wharf at Long Beach, and all but a small part of the quarry product has to be towed that distance. Most of the year the trip is a delightful one, but there are stormy days in the winter when even the gentle Pacific gets rough and boisterous. But no matter what the weather may be the barges are loaded and the tow boats drag their loads steadily toward the Long Beach wharves.

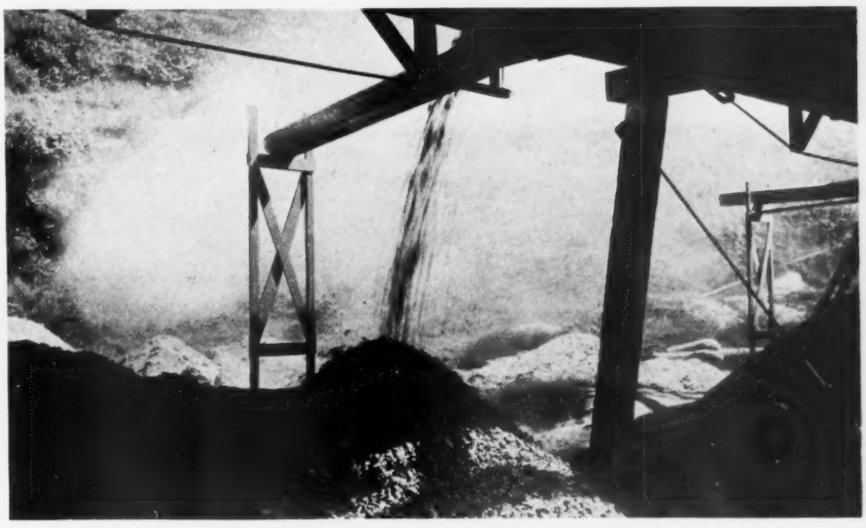
Catalina is a great mass of volcanic rock some twenty miles long. The sides rise sharply from the sea to a height of more than a thousand feet except at a few places. Beside Graham Bros. quarry there is a quarry at the other end of the island from which the city of Los Angeles gets rip-rap; and there is a silver and lead mine, not now working but valuable as a water supply for the Graham Bros. quarry.

The rock is a felsite, a light colored volcanic rock which differs from the more familiar trap rock in that it lacks the ferro-magnesian minerals that give trap its color and weight. More specifically the rock is andesite with about 61.5% silica, the remaining constituents being principally lime, magnesia and the alkalies, soda and potash. Its specific gravity is 2.65, and it is harder than most rocks sold in southern California for aggregates. Los Angeles city and county engineers do not use the ordinary wear test, but one that is called the Los Angeles rattler test, which is somewhat more severe. The loss of Catalina rock by this test is 16%, but the hardest rock in the district loses 12%, and losses between 20% and 30% are most common. The limit for city and county use is 30%.

George Adams Roalfe, consulting engineer, who has done much work for Graham Bros., tells me that the island apparently has been built up by more than one lava flow, and that the rock varies considerably in different parts of the island. It is heavier and harder at the Graham Bros. quarry than elsewhere.

The quarry started off with a spectacular "big shot" that brought down hundreds of thousands of tons, and was a news feature for all the papers on the Pacific Coast. This was in a hilly point that has been cut away so that the highest point in the quarry face is now 526 ft. above the floor. Owing to the great height, blasting by coyote holes (almost the standard method in the West) became difficult to manage. So the present combination system was adopted, well-drill holes being used for the upper part of the ledge and coyote holes for the bottom. The well-drill holes are put down with a Star drill rig using gasoline power; the coyote hole work is done with Cochise air drills.

An unusual amount of fines results from quarrying this rock, not due to the method employed but to the nature of the formation. Like all volcanic rock it was first fractured and seamed by the cooling strains,



Dust is removed by blowers from the rock as it is loaded on the barge

Loading conveyor discharging cleaned stone to barges

and one may presume that earth tremors common enough on the West Coast, caused enough rubbing of surfaces to account for the fines. Whatever the cause may be, the fines are the reason for the most difficult part of preparing the rock for the market. It is estimated that they form nearly 20% of the material. However, they are not waste by any means. There is a strong demand for them to use in making unpaved highways; for the cementing quality is such that they pack and roll down to an excellent riding surface. Miles of the main roads on the island have been surfaced with these fines, and they are regularly shipped to the mainland to be sold for a similar purpose.

Three shovels are used in loading, two Marions which have 1¾-yd. dippers and a Bucyrus with a 2½-yd. dipper. All are steam driven. They load into side-dump cars of a somewhat unusual pattern made by the Llewelyn Iron Works, Los Angeles. These hold 10 cu. yd., water measure, and are usually loaded to 8 cu. yd. They are drawn in by three 7-ton Plymouth locomotives. The run to the track hopper is not much over 500 ft., and the track system is a simple one, two parallel tracks and cross-overs.

The car dump is a frame with hooks that is pulled up by a hoist with an arrangement for returning the car body gently to the trucks. The hopper is, comparatively speaking, a small one directly above the 60-in. Traylor, primary, jaw crusher.

The crushing plant at this quarry was considered an innovation when it was built. If it was not the first of its kind it was among the first. Even today it is not a common type, although some of the largest and most important plants of the country have similar ones, notably two that were built quite recently on the Hudson River.

The problem at all these plants is not only to crush the material but to convey it a considerable distance horizontally and also to carry it down hill. In this, and in the plants which followed, the problem was solved by placing the various crushing and screening units at points on the hillside and connecting them by conveyors. By this method the plant is strung out for some distance, a disadvantage that is counterbalanced by the simplicity of arrangement, the lack of elevators, the placing of all machines close to the ground, the ease with which changes and additions may be made and others which a study of such plants will suggest. The advantages and disadvantages of such a type are still being discussed, but so far as this particular operation is concerned it seems to fit the conditions as no other type would and its choice was an excellent piece of engineering.

Towboat with a bargeload of rock for the mainland

Below the primary crusher is a 1000-cu. yd. hopper, dug from the solid rock, that provides a considerable storage. This leads to an S.-A. apron feeder and belt conveyor, that feeds into the primary screen, 60-in. by 18-ft. It has a main section of manganese steel plate with 3½-in. holes and an 8x8-ft. jacket with 1-in. holes. The oversize goes to a Telsmith crusher of the primary breaker type, driven by a 75-hp. motor.

The products of this screen and crusher go to a bin which is high enough so that it can feed by gravity into the plant unit immediately below. The crusher product is sent to the intermediate screen, which is 48-in. by 16-ft. and has 1-in. square holes and no dust jacket. The oversize of this screen goes to a 4-ft. Symons cone crusher with a 100-hp. motor and a Telsmith No. 4 gyratory with a 60-hp. motor.

Up to this point the plant is as it was originally built except for the installation of the cone crusher. In the next unit, however, there have been some important additions. Originally there was a single screen at this point, but now there are four, all 48-in. by 18-ft. with 1-in. holes in the main section and ⅜-in. square holes in the outer jackets. The purpose of these is to take out the fines which are sent by a conveyor to bins at one side and near the highway. Trucks load out the fines here for making and repairing the roads on the island.

Loading wharf. The automatic weigher is in the structure at the right

In this division of the plant are four 9-in. by 36-in. Cedar Rapids jaw crushers, which take the oversize of the screens. The use of jaw crushers for final reduction is unusual, and this particular type of crusher was designed more especially for crushing gravel, so its use in a plant of this kind

is indeed unusual. However, Mr. Forrest, the manager, said he was entirely satisfied with the performance of these machines, the wide and low jaws giving great capacity with low wear and power consumption. Only two 25-hp. motors are required to drive them.

There is still another unit which is at the end of a long conveyor that takes the material after the screening and crushing just mentioned. This houses a vibrating screen with ⅜-in. square meshes, and the undersize from this is sent to a truck-loading bin at the side.

The product then goes to the wharf, passing over a Merrick conveyor "Weighometer." Mr. Forrest says this is a great aid in loading barges and in keeping track of production. The device is accurate, and it is watched during the loading to see that the barge gets just 1000 tons, or 750 tons, according to the type of barge being loaded.

Boom elevator and support

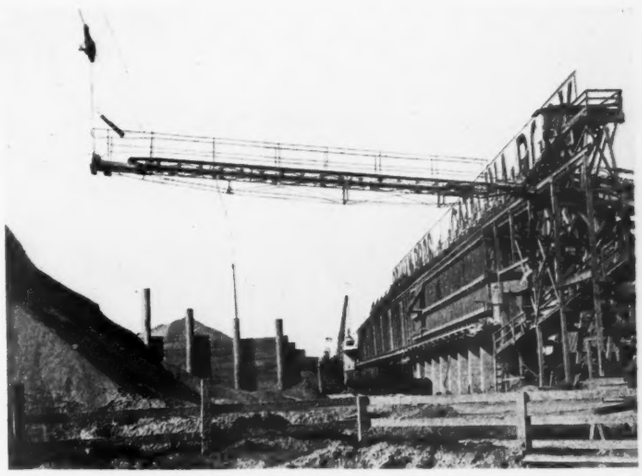
The product goes over a washing screen before it falls on the barge, and it is washed again on the barge. But this is not the only cleaning it gets. The bulk of the fines has been removed by the screens mentioned above. Then the dust is blown off at another point. The rock passes over a screen as it falls to a hopper above the conveyor that takes it to the landing, and a draft of air is drawn through the screen and blown out of a pipe at the side. A heavy cloud of dust comes out with it. Even this cleaning, and the washing that follows, is not considered sufficient, for the rock is given another and very thorough washing at the Long Beach wharf before going to the final storage and sale. The writer knows of no other operation in which so much trouble and expense is put into making the cleanest possible product.

For running air drills and other purposes there are three compressors in a shed near the blacksmith shop on the quarry floor level. Two of these are of Chicago Pneumatic make, one with a 100-hp. Westinghouse motor and the other with a 75-hp. Fairbanks-Morse motor. The third is of Ingersoll-Rand make with a 75-hp. Westinghouse motor. Most of the other electric motors in this plant are of Westinghouse make.

An unusual piece of equipment at this point is a zeolite water softener made by the Luitweiler Pumping Engine Co. The mine water is very hard and the softening prevents the formation of hard scale in the steam shovel boilers, which was a cause of considerable lost time and repair expense before the softener was installed.

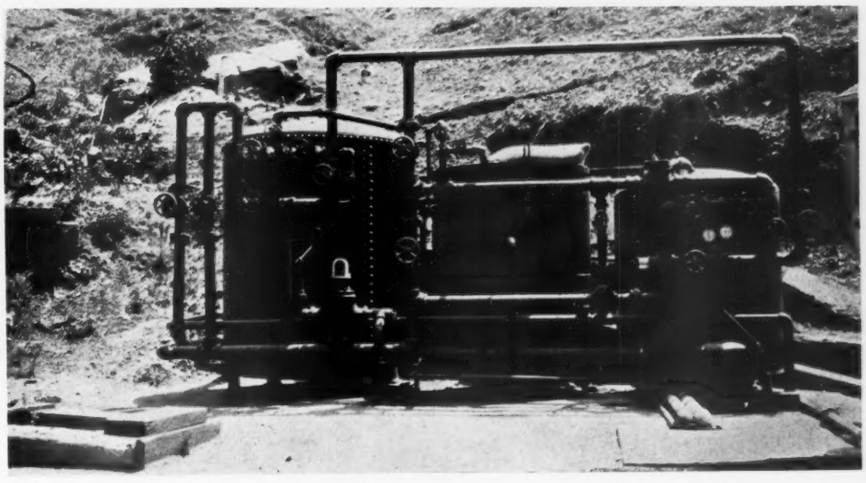
Two types of barges are used, the ordinary square-end type and a special type molded like a ship's hull, and as carefully built. This is the *William Muller*, and most people seeing it afloat think it to be the hull of a sailing vessel descended to the ignominy of being towed, as so many of them have in the past 20 years. But Mr. Forrest says it was built about four years ago for the purpose, and was especially designed to offer as little resistance as possible to being towed. It was rather expensive to build, as barges go, but it is a considerable saver of time and power. It holds 1000 tons and is pulled across to the mainland in seven hours or less by a towboat with a 150-hp. Diesel engine. The two barges with square-ends, holding 750 tons each, require about 10 hours time. (The fast passenger boats to Catalina take two hours for the trip.)

There are two tow boats with 150-hp. engines and one with a 250-hp. engine, all Diesel powered. The big one is used most in the winter months, when high winds and sometimes heavy seas require the extra power.



Boom elevator building stockpiles

The great bunkers at the receiving wharf, with the huge sign that says "Graham Bros. Catalina Rock," in gargantuan letters, are known to everyone who visits the industrial section of Long Beach. They have been described in Rock Products, so only the main features and some additions made in recent years will be given. In addition to the storage in the bins or "bunkers," as they are always called in California, there is a large storage in the open, in stockpiles



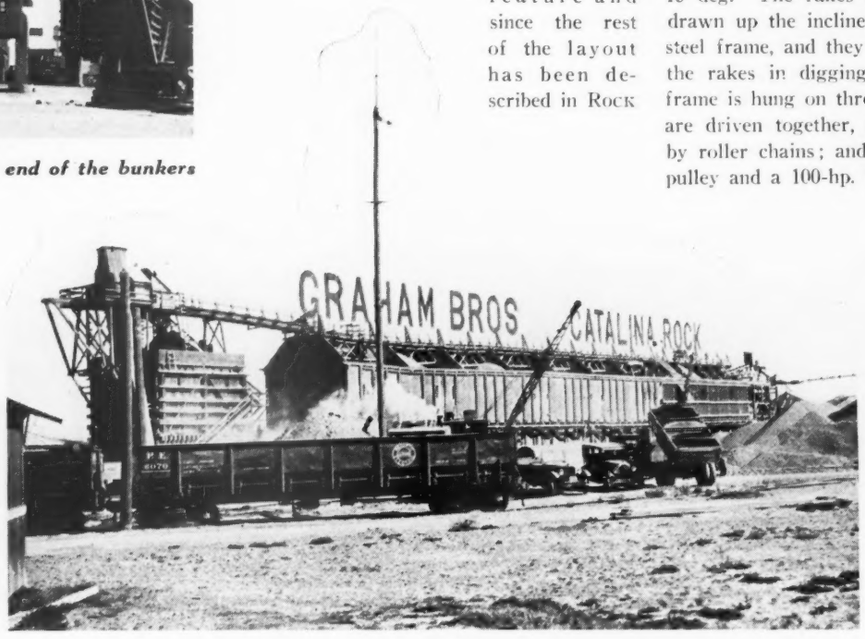
The hard mine water is made suitable for boiler use by a zeolite water softener

Office building at the end of the bunkers

separated by high concrete partitions. These are filled by a boom conveyor that extends from the side of the main building, taking its feed from a tripper on the main conveyor that runs along by the tops of the bins. The manner of supporting and moving this boom conveyor is unusual. The outer end barges from a double trolley that rides on a cable. There is another cable that goes through pulleys on the end of the boom and on the trolley, by which the boom may be raised and lowered. The boom is provided with two motors, one for driving the belt, the other for propelling it from one stockpile to another. The supporting cable is stretched between two high masts that stand beyond the end stockpiles.

The special feature of this plant's distribution system is that material can be moved by conveyors from "almost anywhere to almost anywhere," as one of the men at the plant put it. On the day the writer visited it, material which had been stored unwashed in a stockpile was being brought back to the dock for washing and separating into sizes. But what might be called the normal flow is from the hopper on the dock to the washing plant, through the washing plant to the screening plant and then to the bins for loading into railroad cars or trucks.

The washing plant is a comparatively new feature and since the rest of the layout has been described in ROCK PRODUCTS this is all that will be described in detail.



Graham Brothers bunkers at the receiving wharf

Stone Washing Practice

The rock to be washed is unloaded from the barges to a hopper on the end of the dock. A reciprocating feeder below the hopper puts the material on a 24-in. inclined conveyor belt that takes it to a washing cylinder in the upper part of the washing plant house. Usually this cylinder is cut out, as the rock is not dirty enough to need scrubbing.

The rock is split between two washers below the cylinder. They are of a type which is unusual, especially for washing coarse material; but, while the mechanism is different, the action resembles that of a Dorr classifier.

The tank, or wide trough, in which the rock is washed is about 24 ft. long and 7 ft. wide. The bottom has a slope of perhaps 15 deg. The rakes by which the stone is drawn up the inclined bottom are set on a steel frame, and they have teeth which help the rakes in digging into the stone. The frame is hung on three heavy cranks, which are driven together, and at the same rate, by roller chains; and these are driven by a pulley and a 100-hp. Westinghouse motor.

The cranks of the two washers are set so that while the rakes of one are digging the material and pulling it forward the rakes of the other are lifted above the material and are returning on the back stroke.

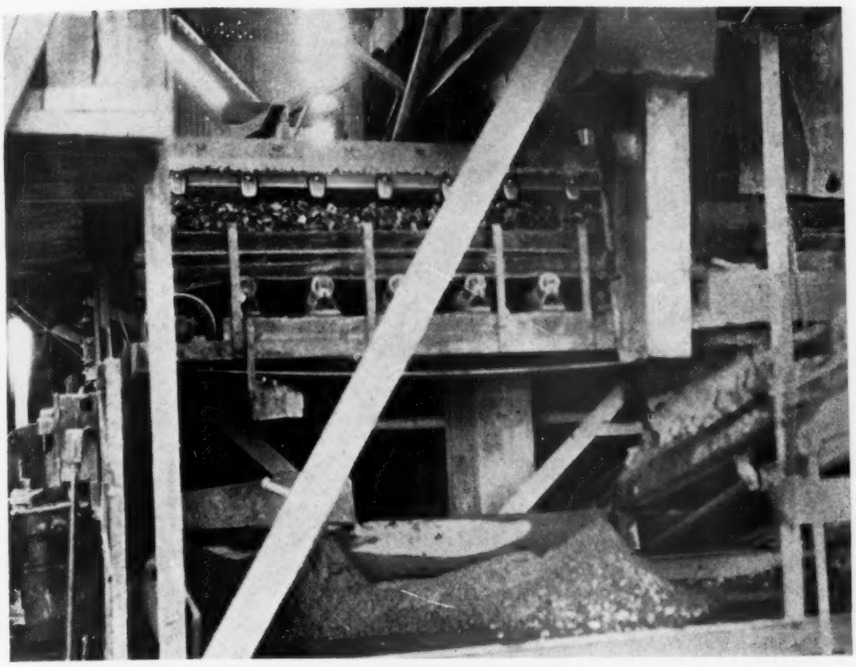
The inclined bottom is sloped so that the lower part is in a rather deep pool into which the material is fed. The upper part serves for rinsing and draining. Heavy sprays of clear water play over the material just as it comes from the pool, washing back any dirty water, and the drainage portion of the bottom is so long that only surface moisture remains on the material as it is discharged.

It falls on two short conveyor belts, that take it to a chute between the washers, through which it runs on a 24-in. inclined conveyor belt that lifts it to the sizing department.

One of the illustrations shows the end one of the washers as it is discharging. Behind the inclined timber may be seen the rake with its teeth and the pile of stone below, just ready to fall on the short belt, the idlers of which show plainly.

Hopper on the wharf and the settling pond

Washing plant for Catalina Island stone



End of the stone washer showing the rake above the short conveyor

A 6-in. Byron-Jackson pump with a 50-hp. motor supplies the water for the washer. This comes from a settling pond that takes the overflow of the washers. It is about 50 ft. square and has a baffle through the center, around which the water must flow before going to the pump section. The intake is under water, and this is an idea that might be adopted in other settling ponds, for it prevents direct currents that carry the mud and do not allow it to settle. The intake pipe is turned up at the end so that the water spreads over a considerable area as it is pumped out.

The water used for rinsing comes from the city mains and there is enough of it to make up for losses of evaporation and the water carried away by the stone. The settling pond is dug out occasionally by a locomotive crane with a clamshell bucket.

The capacity of this plant (both washers) is 170 tons an hour. J. A. Butler, the company's engineer, designed it for this amount and it can produce it without crowding. It is also designed so that rock may be bypassed without washing, a small portable hopper receiving the flow from the first conveyor belt and chuting it directly to the discharge belt.

Since the log washer is considered the standard machine for washing such coarse material as crushed rock, it will be interesting to compare its work with that of Graham Bros.' washer. The best that the writer has seen claimed for a 30-ft. by 7-ft. log washer is that it will wash 500 tons per 24 hours of a material of high specific gravity, using 25 hp. for the washer alone. This is 20.8 tons per hour for 25 hp. It would require eight such washers to do the work of Graham Bros.' two washers, and the horsepower would be twice as much. Evidently it would pay anyone who contemplates installing a stone washer to look into this type. At the same time the writer doubts that it would have the efficiency of a log washer in getting rid of clay balls and soft sand rock, which the grinding action of the log washer will break up so that they can be floated off.

Besides the bunkers and washing plants the layout at Long Beach includes a very handsome office building and a gasoline filling station, the latter a recent addition.

The Lomita Sand Plant

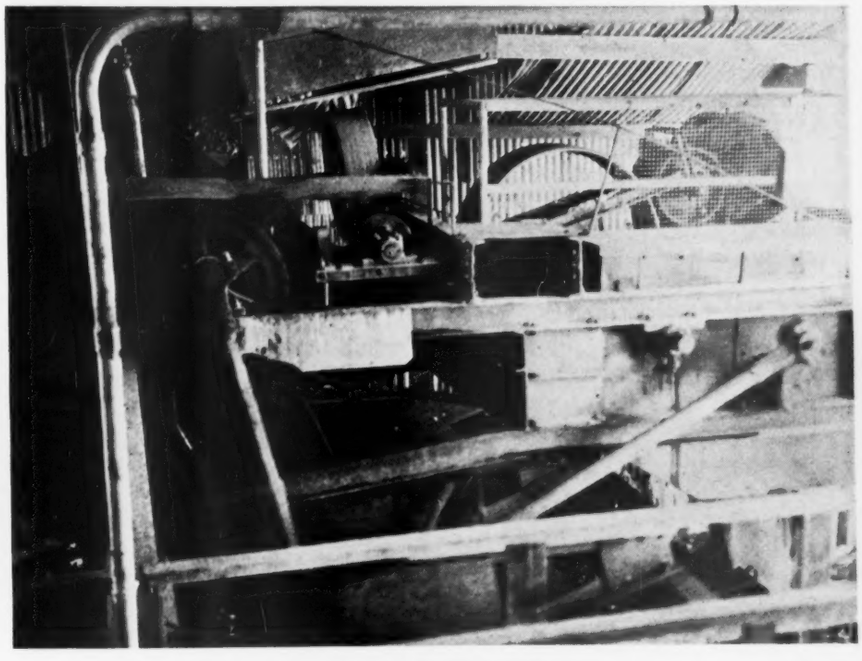
The sand plant at Lomita is about 15 miles from Long Beach, in a locality where a number of sand plants are working or have been working. The low hills along this part of the coast are practically all sand. Deliveries are made by truck and in the peak of the season as many as 100 trucks have been kept in service.

The special features of this plant are the washers, which are like those used for washing stone, except that they are smaller.

The sand is dug by a 2-yd. scraper bucket of local make, which has a crescent-shaped back. It is pulled in and out by a double-drum hoist made by the Washington Iron Works, Seattle, Wash. The power is a 90-hp. Westinghouse motor. The hoist controls go to a tower, about 20 ft. high, which places the operator high enough so he can look over the receiving hopper and see all parts of the pit. Originally the operator sat or stood behind the hoist, in the usual way, and it was found that he could get more than twice the capacity out of his rig when placed to see the bucket.

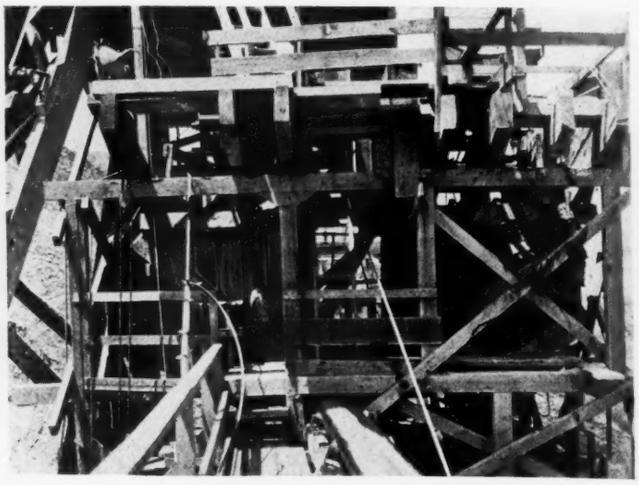
From the hopper the sand is taken by a reciprocating feeder designed by H. F. Murphy, of the company's engineering staff. It is an excellent device free from the clogging and catching to which some feeders of this type are subject. It delivers sand to a bar grizzly with 2½-in. spaces, and this removes the large stones that are found occasionally in such deposits. They are carried away by a 12-in. belt and taken by truck to a small crushing plant that breaks them up for road material.

The undersize of the grizzly falls into the boot of an elevator, which is more than 60



Drive of the rock washer

Gates for splitting classifier discharge between storage belt and bins



Ends of the two sand classifiers and belt with load of sand coming out

ft. high. It is of the close connected bucket type, the tight side running over rollers on a timber frame. The buckets are 20-in. wide. They discharge into a chute which leads into a 6-ft. Gilbert screen, with ⅜-in. round holes in the main section, and ⅛-in. mesh wire cloth on the outer jacket. The oversize gravel goes down a chute to a waste bin; the intermediate size goes to one of two sand washers, fine sand to the other.

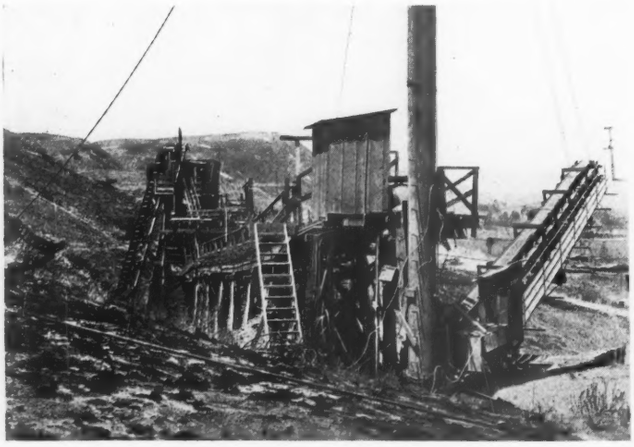
Graham Brothers sand plant at Lomita, Calif.

These washers are run by a 15-hp. General Electric motor through belts. Like those in the stone-washing plant, they are arranged so that while one is drawing up sand the other is on the return stroke, thus keeping down the power requirement. A 15-hp. General Electric motor drives both.

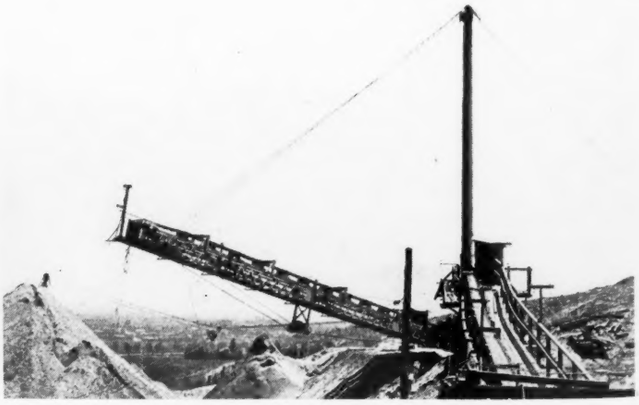
Sand Storage

The washers discharge into bins, or into chutes that lead to the conveyor that takes the sand to storage; and a simple arrangement permits sending all or part to either bins or belts, so that the grading may be regulated. One of the illustrations shows the ends of the washers and the belt with its load of sand coming out below. The other shows the sliding gates by which the classifier discharge is split between the belt and bins.

The belt mentioned is 24 in. wide and about 175 ft. long, and it is used to convey the sand to stockpiles. It discharges on to a boom conveyor about 40-ft. long, which can be swung through the greater part of a circle. Stockpiles can be built of differently graded material if desired.



Junction of the storage and boom belts



Swing boom belt for building stockpiles

The recovery from these stockpiles is by an arrowhead bucket of local make, handled by a small hoist; the operator draws the sand from the sand piles to a truck loading bin near the highway, or moves the sand into new stockpiles where this is necessary. The storage system at this point is excellent, as it is flexible and permits storage over a large area.

All delivery is by truck. The plant was designed for a capacity of 500 tons a day but at present is producing 900 tons. O. E. Kendall is the superintendent.

Distributing launder gives an even flow through the whole settling pond

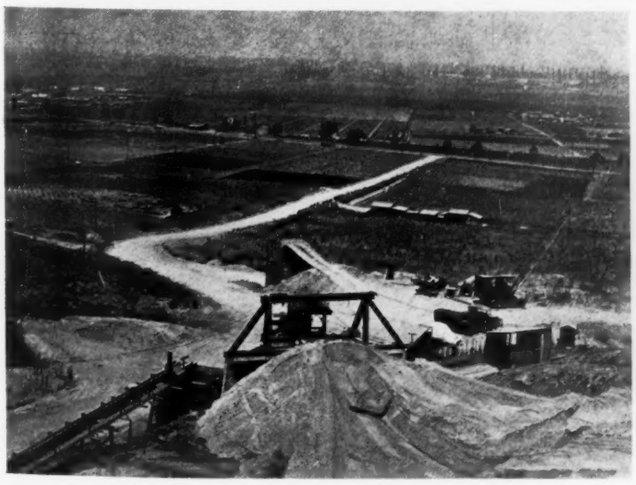
Water is reused as far as possible. Two 6-in. Byron-Jackson pumps return the water to the plant, being connected so that either one or both pumps may be run. The waste water flume of the plant carries the water by gravity to a large settling pond above the pump house.

Mention has been made of the crushing of boulders and gravel for road material. This is done at a little plant a short distance beyond the pump house. It contains a jaw-crusher which takes everything. There is considerable clay with the boulders and gravel and the crusher discharge has just enough to make a good binder for surfacing the ordinary roads of the district. The new sand and gravel plant of Graham Bros., Orange, Calif., was under construction when this was written, but will probably be in operation by the time this is published. A description of it is left for a future article. So, too, is the work of Graham Bros. in giving service to the large purchasers of their materials. The possibilities of Catalina rock as concrete aggregate have been thoroughly studied by George Adams Roalfe, consulting engineer, Long Beach, Calif. A great many sheets have been prepared showing the variations in cost due to voids and gradation and curves have been worked out for the most economical combinations and sizes. By the use of these the purchaser of the Catalina stone is enabled to save money in cement and labor, and what is of more importance, to be certain that he will make concrete which will be uniform as well as of the desired strength.

End view of sand plant showing the sand hopper and elevator

O. E. Kendall, superintendent of the Lomita sand plant

(Mr. Roalfe's investigations have been embodied in a recent article, "Effect of Aggregates on Concrete," and published in Rock Products, September 28, 1929. The article contains the charts and other data referred to by Mr. Shaw in the above.—Editor's Note.)



Arrowhead bucket filling in from stockpiles

Truck bin for stockpile material

Design of Sand and Gravel Washing and Screening Plants

Part VII—Plant and Bin Types—Power

By Frank M. Welch
Chief Engineer, American Aggregates Corp., Greenville, Ohio

PARTS I TO VI of this series have been published in alternate issues of ROCK PRODUCTS, beginning with the April 27, 1929.

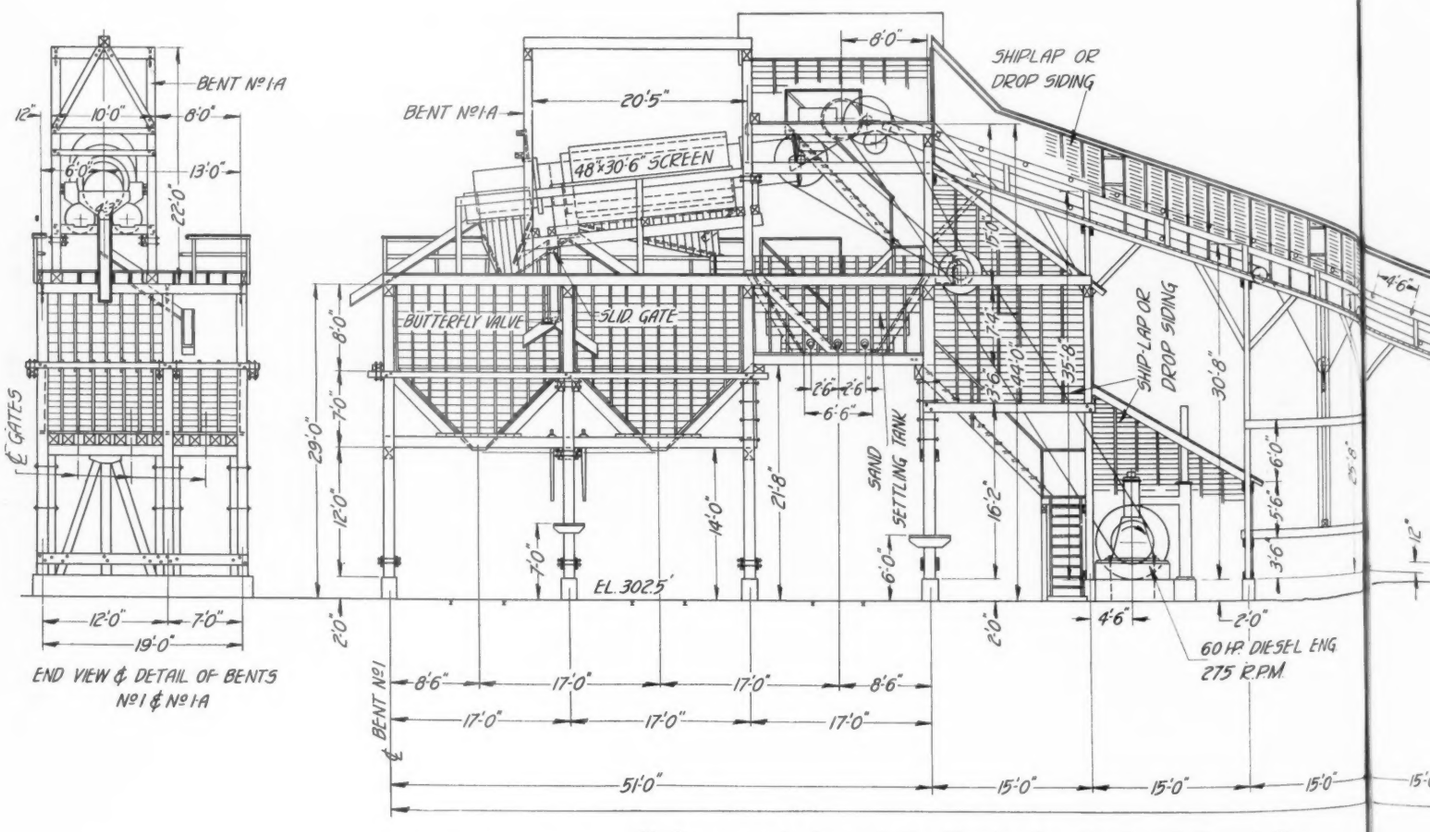
Type of Building

The advantages and disadvantages of various types of materials in plant construction depend to a certain extent upon the locality, the size of the plant and the extent of the deposit. Probably over 90% of all the sand and gravel washing plants in the United States are of timber construction, throughout. Of these about 75% are mounted on concrete footings and the balance on mud sills. Those which are not entirely of wood construction are divided between steel and concrete construction or a combination of the three types. The smaller plants are practically all built of wood, a small number, which load underneath the bins, having concrete walls extending from the ground up to the bin bottoms. From this point up, the bin construction is either of the frame or cribbed type.

Cribbed construction consists of walls and partitions formed by plank laid flat, one on top of the other and firmly spiked together. At the wall intersections, the plank extend through alternately like the corner of a log cabin. The width of plank used depends upon the depth of the bin. The upper 5 or 6 ft. is usually made up of 6-in. planking, the next few feet below of 8-in., then 10-in., and so on down. Very seldom are bins deep enough to require walls more than 10-in. thick. Two-inch plank are ordinarily used. The required wall thickness can be figured from bin wall pressure charts and tables showing strength of timber for various spans. On wide spans, one or more studs are often used to economize on lumber. These studs are tied together through the bins by rods whose strength must also be computed.

Cribbed Construction

The advantages in cribbed construction lie in the facts that third grade lumber can be used with nearly as good results as with first grade and that common labor with one good foreman can do the work as well as a crew of experienced carpenters or millwrights. Its disadvantages are found in its constant settling, which is so great that it is found impracticable to support machinery directly upon it. In order to maintain the machinery in constant alignment, it is necessary to extend posts, directly from the concrete below to a point above the bins for this purpose. The cribbed type of bins are originally borrowed from the grain elevator indus-



Modern gravel plant of the Merriwether Sand and Gravel Co.,

try, where this type of construction has proved very satisfactory.

Frame bins are built up of heavy studding, lined with plank on the inside. The outward pressure on the studs is overcome by very heavy girts surrounding the outer walls and paralleling the partitions. The girts are then tied together by rods extending through the bins. This type of construction has in the long run proven more efficient than the cribbed type. It does not settle and can easier be maintained by relining in after years when the inside begins to rot. It presents much better appearance in that it is always plumb and level.

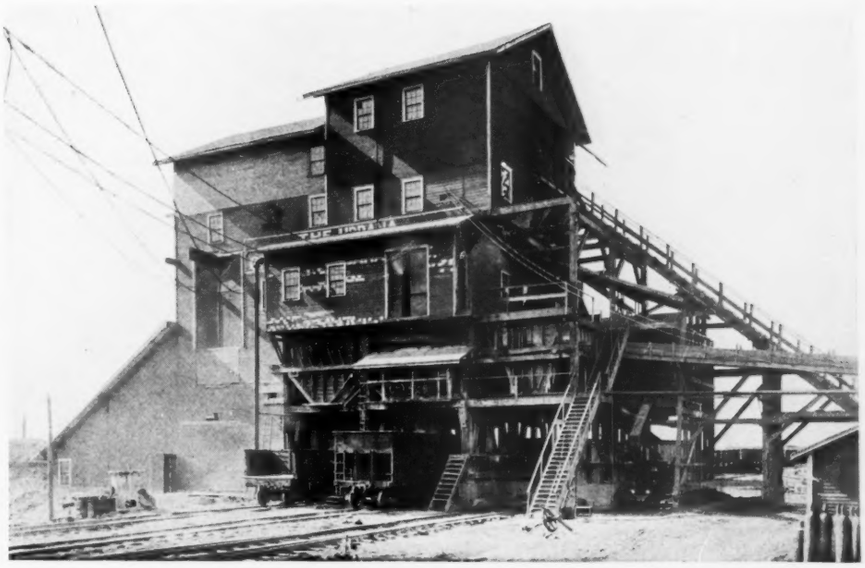
The floor construction of either type of timber bin of course depends upon the load or the depth of the material in the bins. For shallow bins having narrow spans, heavy joists floored over with planking is adequate. In most plants, however, the load is great enough to justify a solid floor 10- or 12-in. thick and in many cases 16- to 18-in. These are built up of any thickness of lumber available, of required width, placed edgewise and well spiked together.

Timber bins, especially those of cribbed construction should be given—both before and after erection, a coat of creosote paint. This will increase their life very materially.

Concrete Bins

Wood bins of any type, however, require a great deal of maintenance after two or three years' service in handling any quantity of wet material. The concrete bin is coming into more common use very rapidly, especially in the larger plants where 10 to 20 or 30 years' life is expected. The concrete bin is more expensive in first cost than any of the other types, even after considering that the necessary sand and gravel is already on the job. However the almost infinite life of these bins, their great supporting strength for overhead machinery, and their freedom from constant leakage of water underneath where loading is going on, makes them by far the most economical investment. A large yardage of concrete can be saved in the construction of such bins by proper reinforcing. The detailed designing of them should always be placed in the hands of an experienced engineer who specializes in reinforced concrete construction.

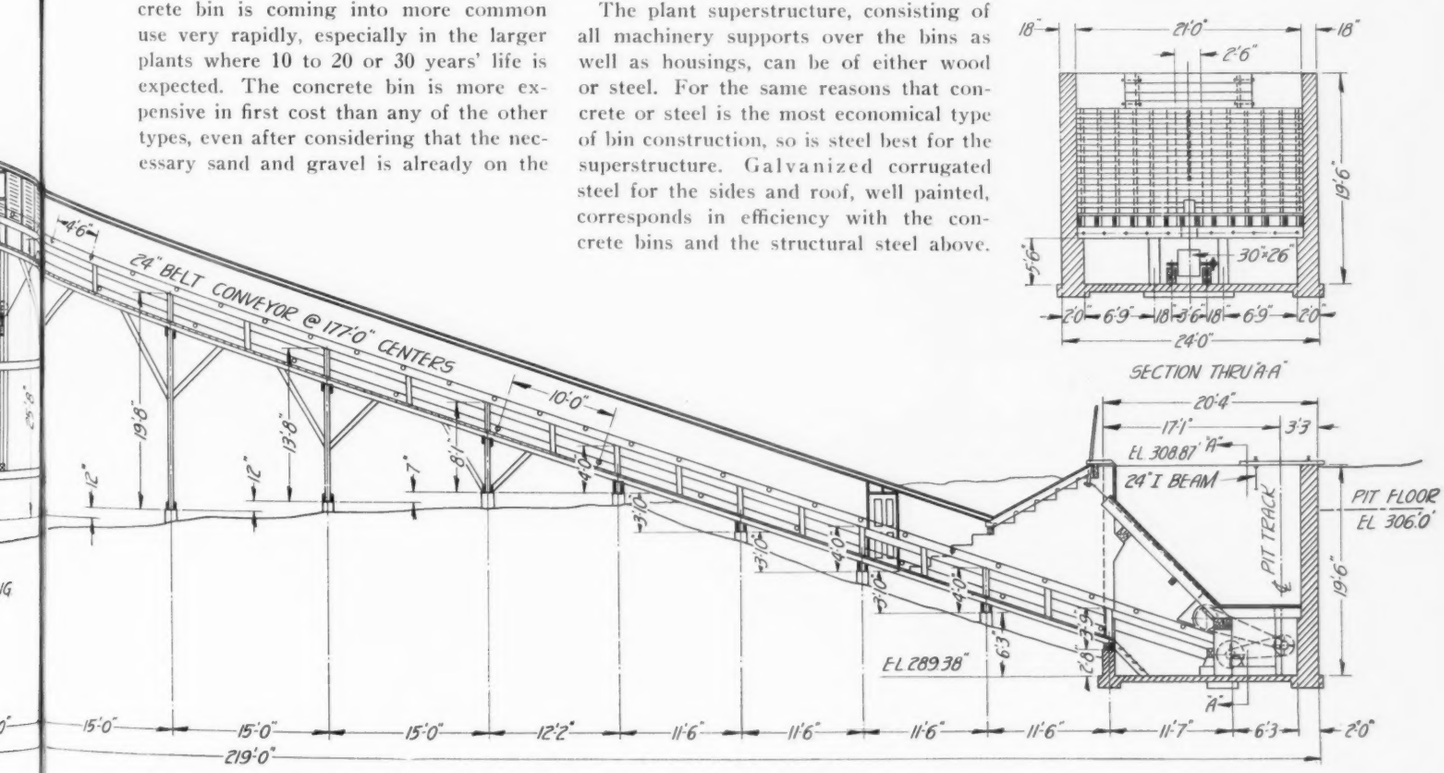
The plant superstructure, consisting of all machinery supports over the bins as well as housings, can be of either wood or steel. For the same reasons that concrete or steel is the most economical type of bin construction, so is steel best for the superstructure. Galvanized corrugated steel for the sides and roof, well painted, corresponds in efficiency with the concrete bins and the structural steel above.



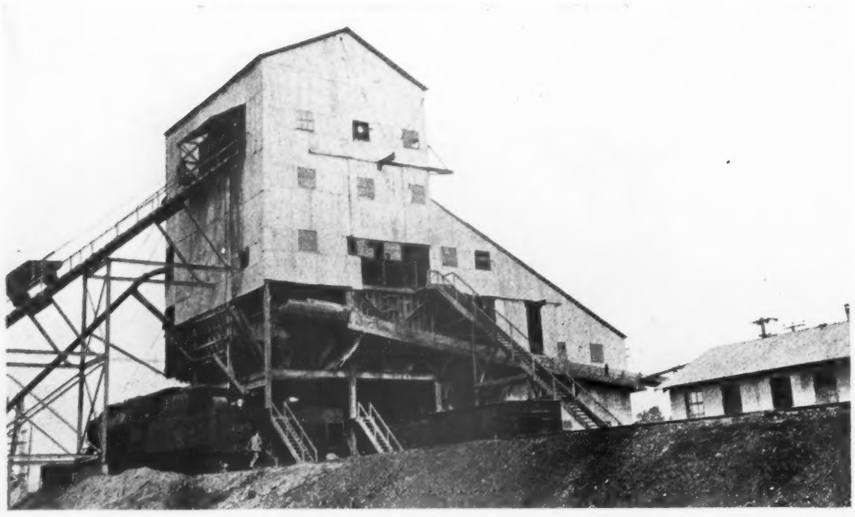
Urbana, Ohio, plant, American Aggregates Corp.—a modern 3-track timber-constructed operation. Excavation is by 15-in. suction dredge

Economy, however, is found in building the conveyor trestle of wood, on account of the light construction required. A gallery of corrugated steel sides and roof to match the plant, complete a very efficient design. The protection to the conveyor belt from the weather afforded by the gallery, soon pays for the investment. It is very customary to use No. 26 gauge corrugated steel on the sides and No. 24 gauge on the roof of the entire plant.

Inasmuch as the main business of the



located at Lewisville, Ark., making its own power by Diesel engines

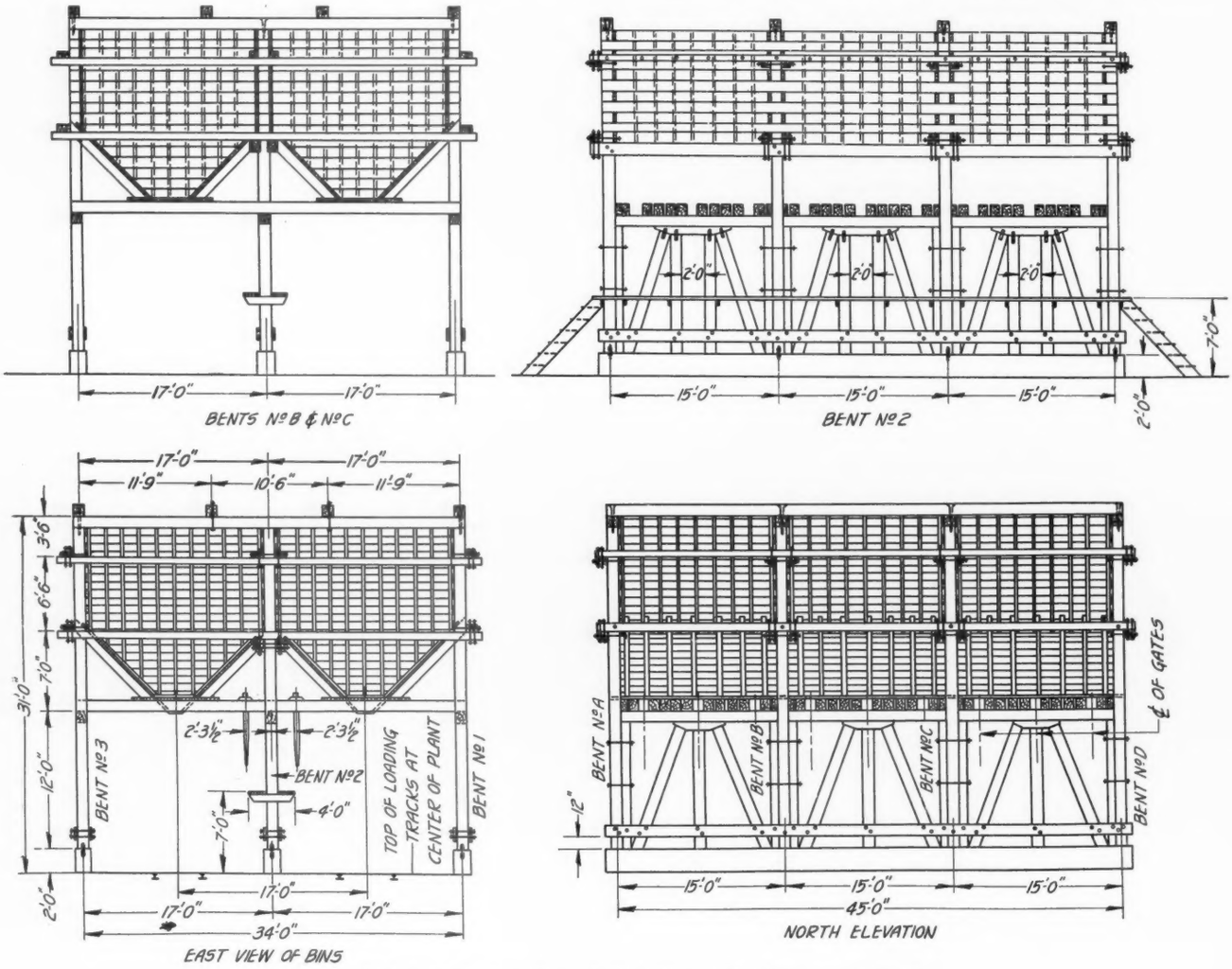


Modern plant with galvanized corrugated steel housing timber construction; Columbus, Ohio, plant, American Aggregates Corp.

gravel producer is the manufacturing of concrete aggregates, promotion of concrete construction is extremely to his interest. I know of no better way to advertise and promote his business than to construct as much of his plant as possible of concrete.

Power

The question of power is one which is solved daily in many industries where nothing in common with the sand and gravel plant is found except the approximate amount used. No sand and gravel plant is large enough to justify making its own power, if electric current can be reached within five or ten miles at a price in proportion to customary rates. In all industries using less than say 1000 h.p., economy is found in purchasing from a central generating plant. The large power plant like the large gravel plant or any other large undertaking is more economical than the small one. Furthermore, the reliability and assurance of constant service from the central plant, where reserve units are always available, is indispensable to the sand and gravel plant, where during the busy season every hour is worth many dollars. Even if it is found necessary to install a power plant at the pit, it is well to add a generator in order that the remote units, such as pumps, shop, etc., may be motor driven to eliminate transmission machinery, long steam lines or small segregated boilers. The presence of electric power at the plant also permits electric lighting which facilitates necessary night work during the busy season.



Plan and elevation of modern timber bins using frame construction

In closing, let me emphasize to the prospective builders of sand and gravel washing plants, the importance of first finding a pit of suitable quality, advantageously located with reference to the markets and shipping connections, and of sufficient extent to justify the investment. Then construct the plant to last until the ticable, because the wear and tear on equipment handling sand and gravel is greater than in any other industry. See that as many duplicate parts as possible are used in the design of the various machinery and arrange to keep on hand extra parts to fit every point where sudden breakage will shut down the entire plant.

(This concludes Mr. Welch's series.—Editor.)

British Excavating Machines for Sand and Gravel

IN A PAPER by W. H. Barnes, read before the London and Home Counties Branch of the (British) Institute of Quarrying, it is noted that enormous strides have been made in the development of excavating machinery in Great Britain since the war. Before the war only shovels and cranes were obtainable, and these only as distinct machines. Now convertible forms may be had for use as several types of excavators. Two types which the paper mentions, the back-acting shovel (trench hoe) and the skimmer, have not yet been applied to sand and gravel excavation (the field which is covered by the paper) in the United States. *The Quarry Managers' Journal* reprints the paper in full in a recent issue and shows the different machines and their special uses.

Recommended Tractor Types

Caterpillar traction is recommended for all excavators used in sand and gravel work, and a part of the paper is given to discussing the mobility of draglines and shovels so mounted. This is because, it is explained, many producers own more than one pit and often find it convenient to move a machine from one pit to another, sometimes to use one type of machine for stripping and another for digging the bank material. A moving speed of ½ m.p.h. is recommended, with which a machine can surmount a gradient of 1 in 5 or 6. Moves of 5 to 20 miles are economical in England, and in India it has been found economical to move an excavator 100 miles by its own power. The addition of a 1 m.p.h. speed to be used on level ground is recommended where much moving is to be done.

Discussion of Excavating Machines

The excavators discussed are the straight shovel, the dragline, the skimmer, the back-acting shovel and the grab, or locomotive crane and bucket. The skimmer is described as one of the forms possible with a convertible rig. The boom is placed horizontally and supports a scraper bucket, the back end of which is attached to rollers that run in guides on the boom. The bucket is pulled in and out by a line, and as the pull is straight and the bucket is held to its work by the weight of the boom, it is especially useful for digging hard and difficult ground. It is dumped by raising the boom to about a 60 deg. angle.

The back-acting shovel resembles an ordinary shovel except that the dipper is turned toward the body and the boom and dipper stick can be let down so as to dig below the surface, as a dragline digs. In the United States it is commonly called a trench hoe. Dumping is through a door in the front of the dipper or by lifting the dipper high enough to pour out the dirt.

Each of the excavators mentioned is considered the first choice for certain conditions and a list of applications is given: For stripping, a shovel is recommended (1) if the overburden is more than 3 ft. thick and can all be removed and sent to waste, and (2) if the material is difficult to dig. A dragline should be used for stripping (1) if the overburden is less than 3 ft. thick and not too difficult to dig; (2) if the overburden can be removed and the sand and gravel excavated afterward by the same machine; (3) if the top soil or loam has first to be removed and kept separate from the sub-soil, and (4) if the surface of the sand and gravel is too wet for a shovel to work upon it safely. A skimmer should be used where there is only 1 ft. to 2 ft. of overburden to remove and the surface of the sand and gravel has to be carefully cleaned.

For excavating the sand and gravel after stripping, a shovel should be used (1) if the bottom is sufficiently dry and firm so that cars can be loaded on the bottom, or on the surface if the working face is not too deep, and (2) if the sand and gravel is very hard and compact.

The dragline should be used (1) if the material is not too difficult to dig and it is desired to load cars on the surface of the ground, (2) if water is present in the workings, (3) if it is possible and advantageous to remove the material in layers; for instance, in one pit the dragline is standing on the surface, first removing about 2 ft. of overburden, then about 3 ft. of dirty gravel, then about 2 ft. of clay, and finally about 10 ft. of good gravel. A pit of this description requires a 40-ft. boom for efficiency.

The back-acting shovel should be used where the material is rather too hard or difficult to dig with a dragline.

The grab is recommended for use in stockpiles and for excavating to a greater depth than a dragline or back-acting shovel digs.

In discussing motive power it is stated that only in countries like the United States, where gasoline is cheap, can the gasoline engine be used on shovels larger than ½-yd. capacity, but figures given later on fuel costs for shovels up to 1½-yd. capacity include gasoline and show that it is cheaper than coal in steam shovels. The gas-electric and crude-oil-electric types are discussed and it is concluded that they have no economic advantage over the straight motive powers.

Excavation Costs

Average fuel consumptions for small shovels are given as: Coal, 5 lb. per yd.; electric current, 0.4 kw.-hr. per yd.; crude oil, 1 gal. per 35 yd.; gasoline, 1 gal. for 30 yd. The average prices for these are given as: Coal, $7.20 per ton; electric current, 1½c. per kw.-hr.; crude oil, 10c. per gal. (presumably the Imperial gallon of 10 lb.), and gasoline, 30c. per gal. From these figures the cost per unit of excavating works out to:

Crude oil	0.3c. per yd.
Electric current	0.6c. per yd.
Gasoline	1.0c. per yd.
Coal	1.6c. per yd.

A table is given showing the cost per day of operating small shovels with different motive powers under ordinary English conditions. (The figures in it and the costs given above have been converted from English money by taking 1 shilling equal to 24c.)

The paper admits that pumping may sometimes be a better and cheaper method of excavating and transporting material than the use of a shovel with cars. It suggests that in hard ground it might pay to dig the material with a shovel, which would cast it to the suction of a pump for transportation to the washing and screening plant. Such a method has not been noted at any American operation.

COST OF EXCAVATION WITH DIFFERENT TYPES OF MOTIVE POWER

	Steam	Electric	Crude oil	Gasoline	Kerosene
Driver	$ 3.60	$ 3.60	$ 3.60	$ 3.60	$ 3.60
Fireman	2.40	.....	.....	.....	.....
Fuel or current	3.96	1.92	0.72	3.00	2.04
Oil or stores	1.20	0.72	1.44	1.20	1.20
Interest, 6%	1.80	1.32	1.68	1.44	1.44
Depreciation	2.88	2.28	2.64	2.40	2.40
Repairs and renewals	0.84	0.72	0.72	0.84	0.84
Transport of fuel and water	0.84	.....	0.24	0.24	0.24
Washing out and raising steam	0.72	.....	.....	.....	.....
Totals	$18.24	$10.56	$11.04	$12.72	$11.76

Internally-Fired Shaft Kilns With Mixed Feed

Specific Suggestions for Maximum Efficiency

By Werner Moritz
Chemical Engineer, German Lime Association
(Translated by Victor J. Azbe, Consulting Engineer, St. Louis, Mo.)

THE SHAFT of these kilns is practically always round; square and oval shafts were tried occasionally, but only the round cross-section survived. Entirely smooth cylindrical shafts have the disadvantage that they incline to hang. Uniform distribution of coke and stone is, however, best possible in them. Occasional kilns were built having much larger lower than upper diameters; it was found though that due to the large draw zone there were difficulties with proper lime withdrawal. However, if one builds these kilns sufficiently high and slim, then there is not much to be offset against their usefulness. At the present the most often used shape has a gradual, slight enlargement of diameter from top down, followed by a contraction at the bottom. This shape reveals its adoption from blast-furnace practice.

The kiln charge consists of layers of fuel and stone. The best fuel to use is coke or coal of very low volatile content. The height of coke layers in relation to limestone layers depends upon the kind of stone and quality of the coke. The higher the heating value of fuel and the more easily the stone is burned the thinner should be the fuel layer. The distribution, however, of the two should be as uniform as possible over the entire shaft cross-section.

Stone and coke pass first through the upper zone of the kiln called the preheating zone; they are here preheated with the hot products of combustion coming from the lower zones. In the measure the lime that is drawn does the entire mass travel downward. The closer the stone-fuel mixture gets to the burning zone the hotter is the escaping gas and the higher is the charge preheated, until finally it becomes so hot that the fuel ignites. Every fuel has its particular ignition temperature, coke ignites somewhere between 1300 and 1500 deg. F. The heat from the burning coke heats the adjacent, or above, already preheated stone to the point where it begins to give off the carbon dioxide. The first calcination is on the stone surface and later, very uniformly, it gradually penetrates into the inner portions of the stone.

The first gas is driven off very readily. The CO_2 coming from the inner portions has, however, to pass through the very minute pores and occasionally has to overcome considerable resistance. This leads to the conclusion that stone of small diameter burns at temperatures closest to the theoretical temperature required to burn limestone. Small stone, however, has the objection that it obstructs the gas flow through the kiln.

Size of Stone

The necessary air for the fuel burning enters through the draw opening of the kiln and is preheated by the burned lime. It thus arrives in the burning zone very hot, while the lime drawn is cooled. This air has to find its way through the spaces between the lime; if the charge is of too small size, then mechanical draft is necessary, either induced draft, that is, drawing of gases from the kiln; or forced draft, forcing of air into the kiln. In this respect to use a large diameter stone is about the best; such a stone must, however, remain exposed to the high temperatures a much longer time to assure escape from it of all of the carbon dioxide. In practice it is found that to use stone the size of a man's head is best.

Editor's Note

WHILE mixed-feed, internally-fired, shaft kilns are little used in this country for the production of commercial lime (they are used extensively in the sugar and alkali industries) they do have great possibilitites, especially for the manufacture of hydraulic limes and natural cements, which are becoming so popular for mason's mortar and stuccos. Also much of the prejudice against the use of internally-fired kilns in this country, because of the discoloration of the lime, is ill-founded, especially if the lime is to be subsequently hydrated. If the time ever comes in this country, as it has in Europe, when fuel cost is an important item, we shall doubtless see a return to the mixed-feed kiln, because there probably never will be any other type which will give as consistently good fuel ratios for a small initial construction expense.—The Editor.

Fuel

As to the fuel, the following should be taken in consideration: First, the fuel should be as low in volatile matter as possible. This gaseous matter if present would be driven off in the preheating zone without burning. Some coals begin to give off burnable gases at temperatures as low as 250 deg. F. Part of this combustible material has a very low ignition temperature and may ignite and burn in the preheating zone; in that case, however, the kiln would have a very high burning zone and a very limited preheating zone. The best, therefore, is coke or anthracite coal. The coke is of two varieties, metallurgical and gas coke. Gas coke has not as strong a body as the coke used in blast furnaces. Too soft a coke is liable to become crushed by the heavy stone charge.

All sizes of coke are also not suitable, too small coke, ordinarily called coke breeze, is liable to run between the spaces of the large stone and where such coke is used large quantities of unburned coke breeze are often found in the lime when drawn. This is because it passed through the burning zone faster than it should, so fast that it did not become ignited. Of course, it is also true that small coke ignites more readily; then, also, small coke presents a large surface to the air and burns more readily. The air, however, penetrates through its layer with greater difficulty. Then it should also be remembered that coke does not burn as readily as coal. On this account, if the coke is too large, it will not completely burn in the time available to it. The burning of too large coke has also other objections. Coke is a poor conductor of heat. During its burning it is possible that the heat developed is not led away rapidly enough, which causes very high local temperatures and overburning of the adjacent lime. Or if this occurs near to the kiln lining, the lining may be damaged. The best coke size, therefore, is between walnut and egg.

When charging the coke, great care should be taken that it is uniformly distributed so as to assure uniform burning and especially that large quantities of coke do not collect at the kiln walls. Such a condition may seriously damage the kiln lining.

Capacities

Capacity of a mixed-feed kiln naturally depends greatly upon the shaft area. The newer type of kilns are built with shafts not greater than 9 ft. to 11 ft. in diameter. The advantage of large diameter is, of course, large capacity. On the other hand, however, with large diameters uniform coke distribution is not readily possible, which results in ununiform burning of lime; that is, partially overburned and partially underburned.

In Germany, kilns of more than 2750 cu. ft. content are seldom used; if anything, kilns even smaller than this are given the preference. It is only natural that in large kilns draft will be less uniform.

Operation of the kiln is ordinarily such that when the kiln is started the firing begins at its base. Often one finds at the kiln base grates whose purpose is to partially at least screen out the small lime containing most of the ash; in addition these grates facilitate more uniform access of air. On the grates of the empty kiln, first kindling or other easily burning material is placed, then wood and then coal rich in volatile matter, such as ignites readily, on top of the coal coke, then stone and again coke in uniform layers until the kiln is fully charged. In starting, the kindling is fired, which ignites the wood and this in turn the coal above. Since, when a kiln is started, the stone layers are of lesser thickness than ordinarily, the fire will soon be above the burning zone, when regular drawing of the kiln may begin.

Kiln Operation

It is very desirable that following every draw the kiln be immediately refilled. The drawing time should be uniform; it is better for the kiln if it is drawn every two hours, for a small amount, than for a large quantity twice a day. In smaller plants it is found often that the kilns are charged only during the day time. Then, ordinarily, the kiln is drawn very low in the morning and fully charged. During the day the kiln is drawn as well as charged three more times. After that no more drawing or charging takes place until the following morning. Operating under these conditions naturally results in the burning zone passing from the lower into the upper portions of the kiln, when the upper portions of the charge become red hot. It is needless to say that under these conditions more fuel is required because, first, part of the morning charge is not properly preheated; then, also, this practice is hard on the kiln lining due to great changes in temperatures occurring daily, with subsequent expansion and contraction.

To get high capacity a good draft is necessary; as before mentioned, occasionally induced and at others forced draft is used; ordinarily, however, the draft is secured with a chimney located on the kiln. With small stone sizes mechanical draft becomes essential. Natural draft is created by the difference in temperature and consequent difference of density and weight of gases. In winter, draft is therefore better than in summer. The gases entering the chimney should be about 450 deg. F. If more, the indication is that the kiln is operated inefficiently. Less may mean that the charging doors are leaking, which is a very common occurrence.

Lime Saves the Day for Vegetables

By THOMAS H. WITTKORN

HOW LIME turned a loss into a profit and prevented the son from leaving the farm is one of the interesting sidelights from the 21st annual convention of the Vegetable Growers Association of America, held in Philadelphia, Penn., during August. The growers came from 18 states, but all of them turned an attentive ear when lime was under discussion.

It seems that J. Lagaman and Son in Allegheny county, Pennsylvania, the western part of the state, were following in the footsteps of their father and grandfather in the production of vegetables, according to Prof. W. B. Nissely, vegetable specialist at Pennsylvania State College. They had reached the point where leafy crops would not grow and the son was going to look for a job in the city.

To their knowledge lime had never been used on the farm so they were willing two years ago to try an experimental strip across all of their beds. Last year hydrated lime was applied by the carload and at the end of the season there was no fear of the partnership breaking up, as the vegetables turned out better than ever and the bank balance was growing from day to day.

This is the result of a commercial gardener's first introduction to lime. What about the men who have been using it year after year? Well, over on Long Island, for instance, where the growers use intensive methods, lime is being used every day in getting the production of high class vegetables for which that section is noted.

These men buy and apply lime according to scientific methods as Prof. Phillip H. Wessels of Cornell, who is in charge of the Long Island Vegetable Research Farm at Riverhead, says most of them are familiar with the pH scale and that they figure carefully on their needs, as too much lime is as bad for some vegetables as too little.

During recent years the introduction of dust as well as spray in combating the many insects and diseases which pester the growers has made a new and a growing market for hydrated lime. The New York Insecticide Co. of Medina, N. Y., was the only firm in this line at the show, but they had a complete exhibit. Some of their products run as high as 80% lime and 20% copper sulphate, and they require 3000 tons of lime each year to take care of their orders.

Philadelphia growers who are being forced from their present farms into Bucks county because of the steady march of building operations find that they have to be heavy buyers of lime to get their new gardens into the proper condition. They find dealers well able to handle their orders on a fair price so a large part of their problem is solved.

As an index of the large market which exists for lime even in a limestone farming section it might be interesting to note a survey announced a few weeks ago by George Weber, the agricultural extension agent for York county, Pennsylvania. He tested soil samples from approximately 300 farms in his county last year and finds that the average lime requirement as shown by the analyses indicates that they need from 1500 to 1800 lb. of raw limestone or 1000 lb. of burned lime per acre to correct their acidity.

Lime and Gypsum Dust in Treatment of Tuberculosis

DR. F. TWEDDELL, Plandome, N. Y., who has done much to interest the American medical profession in the possibilities of treating pulmonary tuberculosis with lime and gypsum dusts, and whose articles on the subject have been published in previous issues of ROCK PRODUCTS, sends us the following extract from the May 18 *Journal of the American Medical Association:*

"TREATMENT OF PULMONARY TUBERCULOSIS BY CALCIUM INHALATION—Hennes tried inhalations of a mixture of powdered calcium sulphate and calcium hydroxide in 96 cases of pulmonary tuberculosis. Only patients in an advanced stage of pulmonary tuberculosis, with extensive infiltration of both lungs, fever, a poor general condition and symptoms of disturbance of the sympathetic nervous system, such as night sweats, toxic heart and gastro-intestinal disorder and lowered carbohydrate tolerance, were selected for the experimentation. In all patients the symptoms were considerably ameliorated; the tubercle bacilli disappeared from the sputum in one-third of the patients by the end of the treatment, and roentgen examination of the lungs showed that the evolution of the tuberculosis was checked."

The original is an article by H. Hennes on "Treatment of Pulmonary Tuberculosis by Calcium Inhalation" appearing in the German periodical *Beitrage Zur der Tuberkulose*, Berlin, December, 1928. Dr. Tweddell adds that a mixture of calcium sulphate (gypsum) is used with the calcium hydroxide (hydrated lime) because the calcium hydroxide alone is too irritating, causing severe coughing that may result in hemorrhage.

A British Sand and Gravel Plant

A Typical Operation Where Plants Are Smaller and Hand Labor Is More Common

THE MARKED DIFFERENCE between European and American sand and gravel operations is that of size and output. And as European operations are smaller, more hand labor may be used (which may not be altogether a disadvantage where so many laborers are available). The differences are well brought out in a description of what appears to be a typical British plant of the better sort, published in a recent number of the British *Stone Trade Journal.*

The operation described is that of the Lincoln Sand and Gravel Co., of Castlegate, Nottingham, England. The deposit is thinner than would be found profitable for machine digging, as it contains from 4 ft. to 12 ft. of hard glacial gravel under 3 ft. to 4 ft. of overburden. Spade digging removes the overburden, and the gravel is transported in wheelbarrows to a preliminary washer. Here a rough separation of sand and gravel is made by revolving screens, and the two are sent separately to the final washing plant and the loading point.

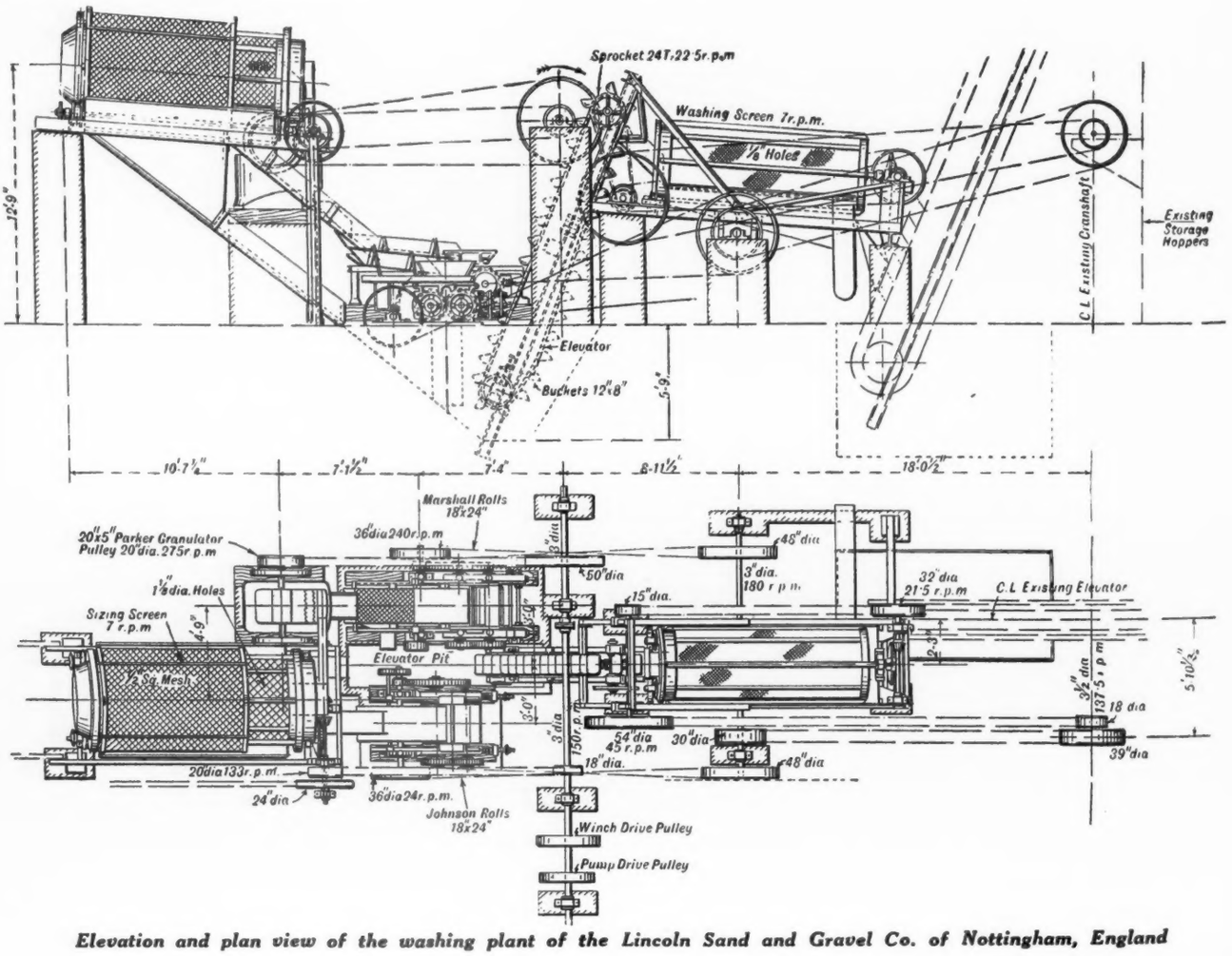
Screening Plant

The gravel is carried in side-dump cars, which are hauled up a 200-ft. plant incline by a wire rope and hoist. It is sent by a jigging conveyor to a Marshall rotary screen, 48 in. by 9 ft. 9 in., which makes two sizes and an undersize. The main screen has 1⅛-in. holes and the jacket is of ½-in. wire mesh. Both oversize and intermediate size are crushed to ½-in., two sets of 12x24-in. rolls and a Parker granulator being used for the work. Everything from rolls and screen goes to the boot of an elevator that lifts to a washing screen, a plain cylindrical screen with ⅛-in. holes. Here the fines and the last of the sand is washed out and sent to the sand stock piles and the gravel is elevated to storage and loading bins.

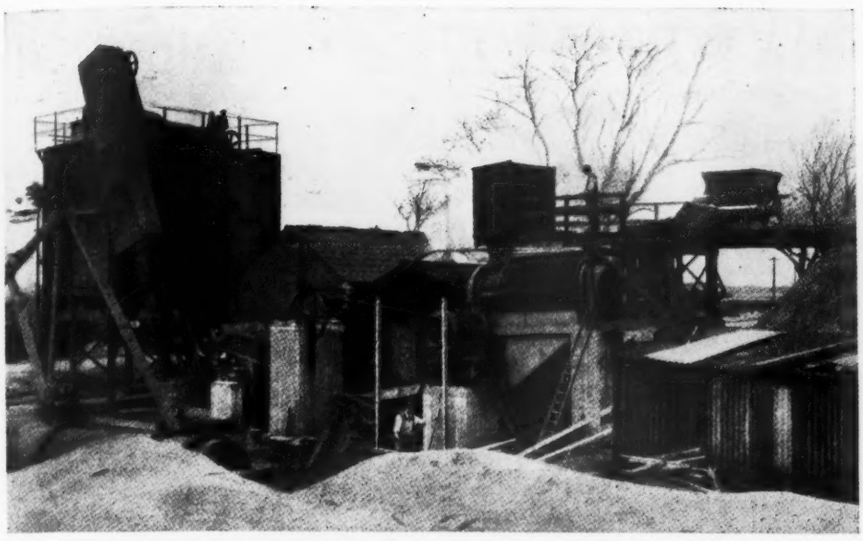
Most of the sand brought up from the preliminary washing plant is dumped beside the railroad track and screened on to a stock pile, from which it is loaded by hand into cars. The remainder is put through a rotary screen to take out grits of the size used for surfacing tennis courts, for which a high price may be obtained. The undersize of this material is sold as building sand. The total output is 120 tons of gravel and 60 tons of sand per day.

The illustrations accompanying the article show it to be a neat and well-designed plant. The crushing equipment appears large as compared to an American plant of the same tonnage, but this is because everything is reduced to ½-in. No American plant of which the writer knows does this; in fact, there are many places where ½-in. stuff is a drug on the market and local associations find their chief problem is to discover new markets for it.

The business described started in a small



Elevation and plan view of the washing plant of the Lincoln Sand and Gravel Co. of Nottingham, England



The screening and washing plant of the Lincoln Sand and Gravel Co. at Nottingham, England

way about three years ago and the plant had to be built to supply a demand for more and better material. The engineering and construction was by Marshall, Sons and Co., of Gainsborough, England.

Farm Buildings to Be Surveyed and Studied

THE ADVISORY COUNCIL of the Farm Structures Research Survey appointed by Secretary Arthur M. Hyde of the United States Department of Agriculture, to work in co-operation with Henry Giese, agricultural engineer of the Bureau of Public Roads of the Department of Agriculture and director of the survey, held its first meeting on August 27 in Washington and adopted a program prepared by Mr. Giese. The council consists of representatives of trade and agricultural organizations and of departments and bureaus of the federal government interested in farm structures. The survey is being made upon the request of the American Society of Agricultural Engineers.

The program contemplates a study of the present status of research as it pertains to farm structures, and a study of a report of existing conditions together with a plan for stimulation and co-ordination of research investigations. The director will make contacts with agricultural and engineering colleges, with state departments of agriculture, with specialists in the federal government, and with industrial organizations and trade associations, in an effort to obtain any research data they may have as a result of studies of the subject. From the information obtained the director will make a report to the council and the report will be published.

It developed in the meeting that manufacturers are handicapped by lack of information on fundamental requirements of farm structures. From existing data, which is largely accumulated opinion without scientific basis, it is difficult to obtain actual facts. Farm buildings recommended by various state authorities vary so widely as to type that manufacturers are at a loss to know how to meet the requirements. It is thought that if some measure of standardization can be brought about, at least within sections of the country subject to the same climatic and other conditions, the manufacturer's problems would be greatly simplified and the cost to the farmer reduced.

Structures represent the largest single item of investment the farmer has aside from his land; in the United States they represent some $11,750,000,000. Apart from the features of beauty and harmony in buildings, the suitability of farm structures to their uses is closely related to agricultural economic welfare. From studies already made it has been found that milk flow is affected by barn temperatures, that egg production depends largely upon the comfort of the fowl, that the kind of storage affects the market grade of corn and small grains and hence affects the returns received by the farmer, and that good storage is an important factor in the orderly and therefore profitable marketing of horticultural products.

Through intelligent planning of buildings for housing agricultural commodities and for giving good care to animals and fowl, the advisory council hopes that as a result of the survey the cost of building construction may be reduced and the value of stored products increased, thus contributing to a lowering of the costs of production and marketing farm products.

Members of the council attending the meeting were: W. G. Kaiser, president, and J. L. Strahan, of the American Society of Agricultural Engineers, Mr. Kaiser also representing the Portland Cement Association and Mr. Strahan the National Association of Farm Equipment Manufacturers; J. W. McBurney, of the Common Brick Manufacturers Association of America, and research associate, U. S. Bureau of Standards; Mrs. Margaret Robinson, of the National Grange; F. P. Cartwright, chief engineer, and J. P. Quinlan of the National Lumber Manufacturers Association; Stanley A. Knisely, director of research, sheet metal trade extension committee of the National Association of Flat Rolled Steel Manufacturers; S. H. McCrory, chief, and M. C. Betts, senior architect, and Mr. Giese, engineer of the division of agricultural engineering, U. S. Bureau of Public Roads.

The full membership of the council represents the American Farm Bureau Federation; the American Society of Agricultural Engineers; the National Lumber Manufacturers Association; the Portland Cement Association; the sheet steel trade extension committee of the National Association of Flat Rolled Steel Manufacturers; the Common Brick Manufacturers Association; the Farmers' Educational and Cooperative Union of America; the National Association of Farm Equipment Manufacturers; the National Grange; the Structural Clay Tile Association, and departments and bureaus of the federal government.

Low-Freezing Explosives Reduce Mining Hazards

THE ART of producing low-freezing explosives has greatly increased the safety factor in the mining industry, according to Dr. Charles E. Munroe, chief explosives chemist, United States Bureau of Mines, Department of Commerce. Frozen dynamite is a most objectionable and dangerous substance, for the frozen "sticks," or cartridges, tend to become rigid, Dr. Munroe points out. For loading into boreholes it is desired that the dynamite "sticks" shall be plastic so that they may be readily pressed into place. There is also the likelihood that rigid sticks may be ignited or exploded by friction against the walls if forced into a borehole. Frozen dynamite is difficult to detonate. Hence a grade of detonator which is quite capable of firing the unfrozen dynamite, and may be depended on to fire it, may not fire frozen dynamite at all, so that a misfire, with all its attendant evils, may result, or it may cause a partial explosion, or burning, giving off large quantities of poisonous fumes into a mine. Naturally such shots are not only a total loss, but, more than that, they are a source of additional expense and of danger. Consequently users of dynamites have been strenuously warned against using frozen dynamite and if it became frozen, to thaw it before use.

Gypsum Uses and Preparation

Comments on a Recent Government Report

By Walter B. Lenhart
Associate Editor, Rock Products

THE UNITED STATES DEPARTMENT OF COMMERCE, through the Bureau of Mines, has made a contribution published as "Information Circular No. 6163," of a general nature dealing with the preparation and use of gypsum. R. M. Santmyers, mineral specialist, of the Bureau of Mines, has compiled this information, much of which has been taken from such old sources that its value to the actual producer is practically negligible, but for anyone not familiar with the industry the publication will serve as an introduction.

The compilation does, however, contain some interesting information on the manufacture of Keene's cement, hydraulic gypsums and on the insulating value of gypsum. The paragraphs dealing on these subjects are reprinted here in full, as well as any other paragraphs that in our opinion will be of interest to the producers.

The mimeographed circular of 28 pages devotes the first five pages to introductory matter defining gypsum, chemical composition, etc. Historical and statistical data of a general nature are included. The physical properties of gypsum are given, including tables showing the weights per cubic foot of the different gypsum products; solubilities are given in tables, most of which can be secured from any reliable encyclopedia.

There is nothing especially new or interesting in the general discussion regarding quarrying, mining, crushing and mill practice.

The various common uses for gypsum are given as well as several that perhaps are not so well known, among which might be mentioned its use as a possible source of sulphuric acid, and other uncommon uses which are here reprinted in full:

"Numerous patents have been issued for extracting sulphuric acid from gypsum, and during the war it is stated that Germany depended largely on gypsum for her supply of this essential. When calcium sulphate is treated in an open tube it decomposes at 1200 deg. C., the products being CaO and SO_3. When it is mixed with molecular proportions of silica the temperature of dissociation is 1005 deg.

"Gypsum may be converted into Na_2SO_4 (sodium sulphate) and the latter into $NaHSO_4$ from which the free H_2SO_4 may be obtained.

Government Aid for the Home Brewer?

"Permanent hardness is desirable in water used in brewing, and the property is chiefly due to calcium sulphate. In some sections of the country where the water is not of this character, it is customary to add gypsum. In such cases the gypsum must be free from marl.

"The following table gives an average analysis of brewer's gypsum:

	Per cent
Gypsum	98.84
Silica	.34
Alumina and ferric oxide	.34
Magnesia	.08
Alkalies	.14
Uncombined moisture and organic matter	.26
	100.00

Keene's Cement Manufacturing Methods

"Keene's cement consists of dead-burned gypsum, that is, gypsum heated to 500 to 600 deg. C. (900 to 1100 deg. F.), to which the property of quick setting is restored by the use of certain salts which act as positive catalysers. It is made by calcining lump gypsum to a red heat; treating with a 10% solution of alum; reburning to a dull red heat and then grinding. The solution commonly used in making Keene's cement (which is also known as marble cement, MacLean's cement, alum cement, and in France as Cement Anglais), consists of 77 to 83 grams of potash alum to a liter of water. Hot water is generally used, thereby increasing the solubility of the alum.

"Keene's cement as originally made in England was produced by burning lump gypsum at a temperature only high enough to produce the hemihydrate ($2CaSO_4$, H_2O), soaking the lumps in a solution of alum, or aluminum sulphate and recalcining at 500 deg. C. (932 deg. F.), after which the lumps were ground. Instead of lumps, finely-ground calcined gypsum may be used. In this case the calcined gypsum is mixed with the alum solution and the hardened masses are broken up and burned in a vertical or a rotary kiln at 900 to 1400 deg. F.

"It is reported that most of the producers of so-called Keene's cement in this country calcine lump gypsum in stationary kilns, grind it to a very fine powder, and add a small amount of powdered borax and other chemicals. The mixture is not recalcined and is marketed as American Keene's cement. Mixtures of aluminum sulphate and sodium sulphate are doubtless employed to give the burned gypsum proper setting properties.

"*Parian cement* is made like Keene's cement and differs only in the fact that a borax solution is used instead of alum. In making the solution, 91 grams of borax are used for each liter of water.

"*Mack's cement* consists of hydraulic gypsum to which 0.4% of sodium sulphate (Na_2SO_4) or potassium sulphate (K_2SO_4) has been added. This cement is unusually hard and durable, sets quickly and bonds well with the background to which it is applied.

"*Hydraulic gypsum* is gypsum which has been calcined at extremely high temperatures and in consequence has not merely been dehydrated but has also lost a portion of its sulphur, is termed 'hydraulic gypsum cement.' Having lost part of its sulphur trioxide this product contains 4 to 10% of quicklime (CaO).

Hydraulic Gypsum

"Hydraulic gypsum is made by heating lump gypsum in an oxidizing flame to a temperature of 900 to 1300 deg. C (1652 to 2372 deg. F.). The gypsum at these temperatures is at a red heat. Higher temperatures are in no way harmful and produce a somewhat better product, but they are expensive and hard to attain. Although a very high temperature is needed to make hydraulic gypsum it is equally necessary that it be burned under oxidizing conditions.

"The hardening of hydraulic cement is not due primarily to the growth of gypsum crystals from solution, as is the case with calcined gypsum. On the contrary, hydraulic gypsum because it is unable to form an oversaturated solution hydrates principally without crystallizing. As a result, it does not substantially change its form. This explains the necessity for densifying the mortar during the early stages of hardening by tamping it so as to force the particles together more closely. The hydration apparently causes a growth and expansion of the particles until one particle adheres to its neighbor by a sort of concretional growth, but this is quite different from the structure of interlocking crystals. The calcium oxide also slowly takes on carbon dioxide and sets after the manner of burned lime.

"Hydraulic gypsum is produced extensively in Germany. There it is burned in a simple kiln not unlike the old-style lime kiln. Lump gypsum is dumped into the top of the kiln and exposed to intense heat generated in the fire box. The red hot mineral is, from time to time, drawn out from the bottom of the kiln, where it is thoroughly exposed to the oxygen of the air. After the kiln has become thoroughly heated the carbon is completely oxidized and there is no smoke. The operation is continuous or intermittent, as best suits the convenience.

"As in lime-kiln practice, it is not practicable to burn the fines because they choke the draft in the kiln. In Germany the fines are used for calcined gypsum or for land plaster and the lump is reserved for burning in the hydraulic gypsum kiln.

"After burning, hydraulic gypsum is coarsely ground as it gives the best results when only a small percentage of the whole passes the 100-mesh sieve."

New Manitoba Sand-Lime Brick Plant

A Winnipeg Clay Brick and Tile Company Adds Sand-Lime Brick to Its Line of Manufactured Building Products

THE ALSIP BRICK, TILE AND LUMBER CO. of Winnipeg, Manitoba, Canada, has long been a manufacturer of clay brick and tile products, and seeing the economies that were possible in manufacturing a sand-lime brick, the company recently built a new plant adjoining the clay products works at Elmwood, an industrial suburb of Winnipeg.

The construction of the plant started June 15, 1928, and was completed September 15, but production was not pushed that year, as the company first wanted to locate all the weak points in the new plant, and during the winter months made necessary changes to be in a position to utilize the full capacity of the plant this year.

Lime is purchased in carload lots from the Moosehorn Lime Co., of Winnipeg, and is delivered to the plant and stored on the floor in the crushing and mixing room. Sand is secured from the company's own pits. The lime is shoveled into a small rotary Sturtevant crusher and reduced to minus ¼-in.

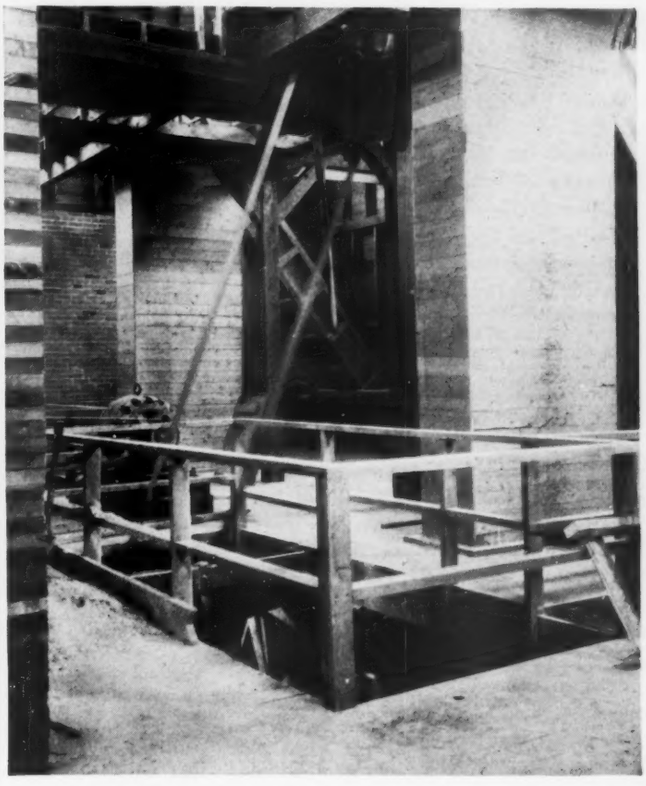
Sand and lime in the proportions of 95:5 parts, by weight, are measured into a square box that acts as a feed hopper for a 16x12-in. bucket elevator, which discharges to a Smith concrete mixer. The mixer, where sufficient water is added to hydrate the lime, in turn, discharges to a similar bucket elevator, which feeds a shuttle conveyor located on top of the storage silos. The mix remains in the silos for at least 10 hours.

The new sand-lime brick plant of the Alsip Brick, Tile and Lumber Co., Winnipeg, Manitoba

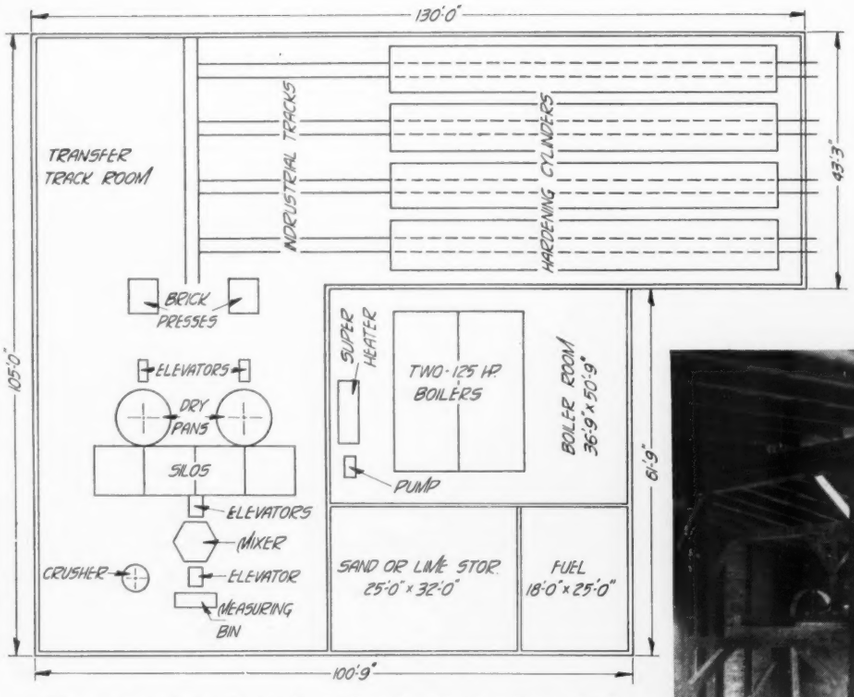
There are four silos of laminated wood construction and each silo holds enough material for 20,000 brick. One silo is filled each day and one emptied each day. The shuttle conveyor that distributes the dampened sand-lime mixture ot these bins is of steel frame, 20 ft. centers and equipped with a 30-in. Goodyear, style "B" rubber belt and has flat carrier and return rolls.

The shuttle conveyor belt is driven from the head pulley of the elevator by an extended shaft on which are keyed two 12-in. pulleys that are so located that by a straight or a half twist of the drive belt any of the four silos can be filled. Giving the drive belt a half twist reverses the direction of travel of the shuttle conveyor belt. The

One of the dry pans for making the sand-lime mix. The scoop discharges the mixture to the elevator at the right



Wood-enclosed bucket elevators used to carry the sand-lime mix to the mixers and storage silos



Floor plan of the Alsip plant showing the locations of the operating equipment

shuttle conveyor rides on flanged wheels and is shifted from bin to bin by hand over a 36-in. gage industrial track of 56-lb. rails. The conveyor was built by the Vulcan Iron Works of Winnipeg. The lime crusher, mixer, the two bucket elevators and the shuttle conveyor are all driven by means of a 30-hp. Canadian Westinghouse motor, type CCL, 850 r.p.m. belted to a countershaft by an 8-in. belt.

Two of the silos discharge to a Berg dry pan and the other two discharge to an American Clay Machinery Co. pan, where the somewhat lumpy sand-hydrated lime mixture is ground and thoroughly mixed.

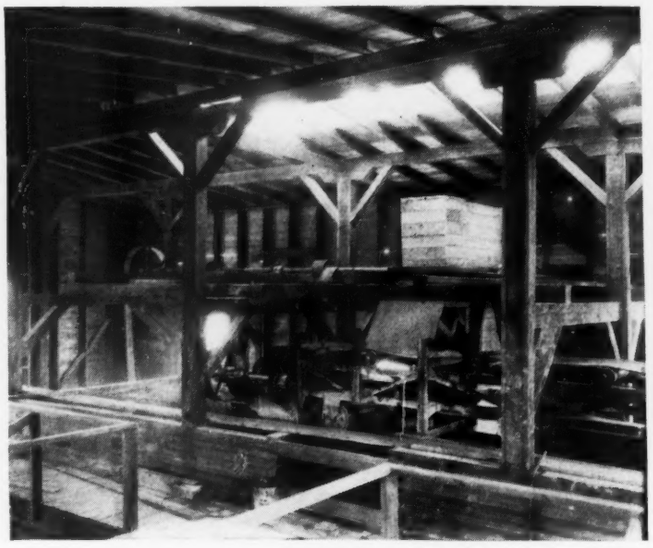
The dry pans are discharged by means of a hand-operated scoop that is dipped into the bed of the pan, and owing to the rotation of the pan and its load the sand-lime mixture is swept into the scoop, which is then removed and the material dumped into the boot of a 6x12-in. bucket elevator that feeds each brick press. The No. 1 pan and its off-bearing elevator is driven by a 50-hp. Canadian Westinghouse motor, type HS, running at 800 r.p.m., and belted to the mill by a 10-in. belt. The No. 2 pan and its elevator is driven by a 45-hp. T. Harding Churton and Co., Ltd., motor, type PS-6, running at 1140 r.p.m.

The two Berg brick presses are capable of exerting 150-ton pressure on the four bricks formed in each cycle. These presses are driven by direct-connected, 30-hp. motors. Press No. 1 is driven by a Canadian Westinghouse motor and No. 2 by a T. Harding Churton motor. The presses were made by the Berg Press Co. of Toronto.

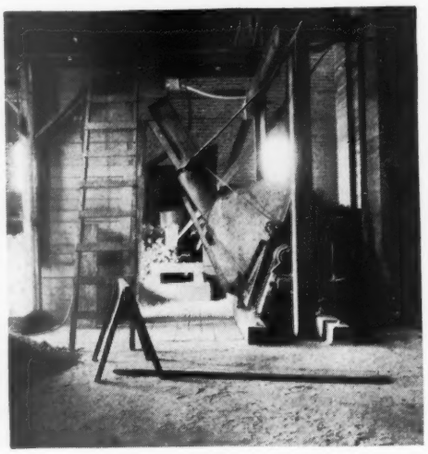
The green bricks are removed from the presses by hand and piled on trucks mounted on industrial tracks and hauled to the hardening cylinders. There are four cylinders, 65 ft. long, and capable of holding 20,000 bricks each. Each charge of brick is subjected to a steam pressure of 125 lb. per sq. in. for a period of eight hours, after which the brick are removed from the opposite end from that where they were put into the cylinder, and are transported over industrial tracks to the yard for storage. The empty trucks are then returned to the presses.

Steam is supplied the hardening cylinders by two 125-hp. horizontal, return-tubular, coal-fired boilers supplied by the Vulcan Iron Works of Winnipeg. The steam pressure in the cylinders is regulated by two dial type, Brown recording pressure gages. Provision is made in the boiler room for an additional boiler if it later becomes necessary to enlarge the plant's capacity.

During the first 30 minutes of operation of the hardening cylinders the condensed steam is not returned to the boilers as water, but is bypassed to waste, but after that interval the hot water thus formed is returned to the boilers for use. All the exposed steam pipe, both to and from cylinders, exhaust heaters, and the cylinders as well, are protected with magnesia pipe covering.



Shuttle conveyor on top of the wood silos distributes moistened sand-lime mix to storage



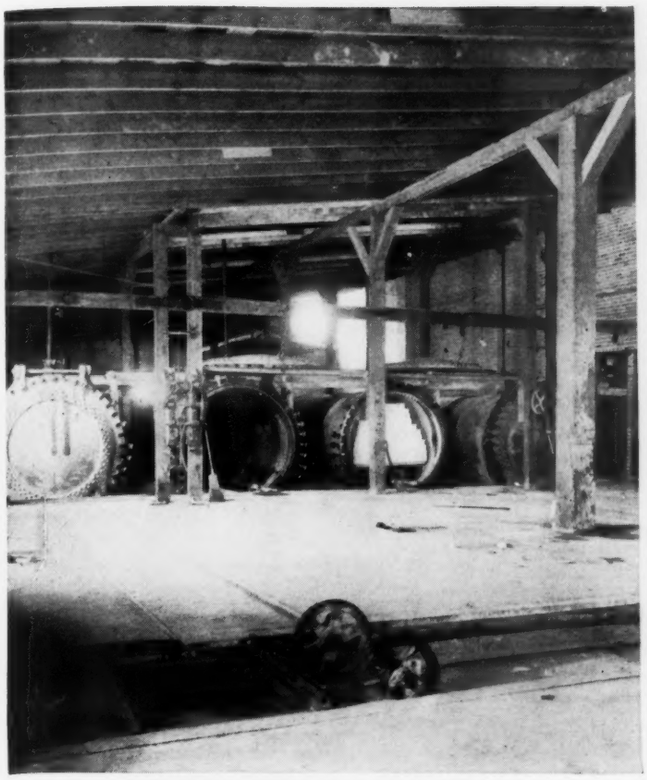
The mixer discharging to the bucket elevator

Power is purchased from the Winnipeg Electric Co., which supplied all the transformers, and delivers the power at 550 volts, 3-phase, 60-cycles, to the various motors in the plant.

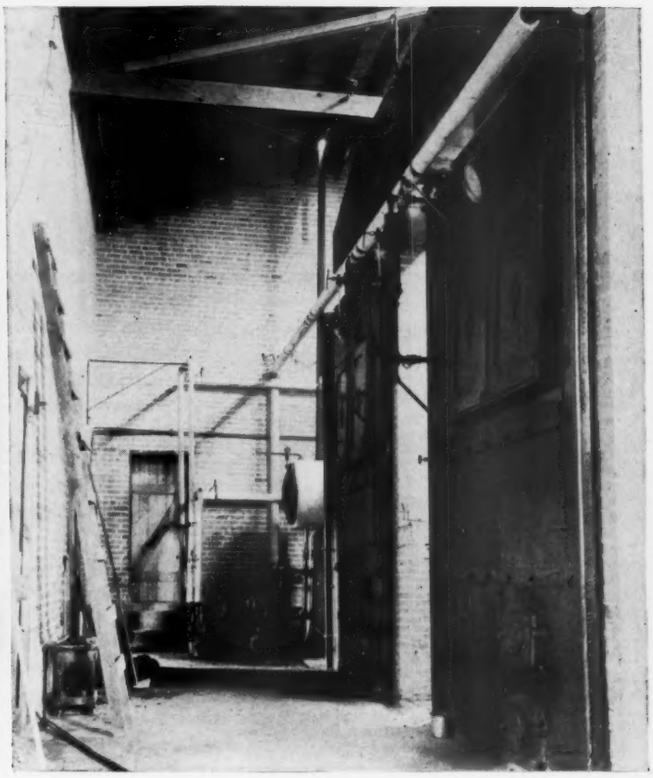
The building housing the sand-lime brick equipment is long and narrow one, one story in height for the most part, although that portion eclosing the bins and elevators is higher. The walls are of brick with wood roof construction and with concrete floor throughout.

The brick made at this plant are white and of very pleasing appearance, and are finding a ready market, economic advantages of sand-lime brick being well known in Winnipeg. Many of the newer and more prominent buildings in that enterprising city have been built with this type of brick.

The Alsip Brick, Tile and Lumber Co., Ltd., has sales offices in the Tribune building, Winnipeg, and manufactures clay brick, hollow tile, etc., as well as handling a complete line of builders' supplies. The officers of the company are: W. P. Alsip, president; A. A. Alsip, secretary-treasurer; E. L. Al-



Four 65-ft. hardening cylinders, each of 20,000 brick capacity, at the Alsip plant



Two 125-hp. boilers supply steam for the hardening process

sip, plant superintendent, and R. G. Graham, general manager. The plant was designed by the company and erected under the direction of E. H. Gunderson. W. A. Massey is in charge of the plant office.

Portland Cement Plant for San Diego, Calif., Projected

PORTLAND, Ore., men and California capital were announced recently as backers of the establishment at San Diego, Calif., of a portland cement plant, according to J. Fred Larson, formerly of Portland and Astoria, who announced the proposed construction of a plant to cost ultimately $2,000,000.

The Columbia Cement Co. includes in its officialdom ex-residents of Portland, among them being Fred A. Ballin, formerly of the Supple-Ballin Shipbuilding Co. Mr. Ballin also formerly was connected with the Monolith Portland Cement Co., now headed by Coy Burnett, ex-Portland lawyer.

Another member of the Columbia Cement Co. is T. R. Larson, who for 20 years was engaged in the manufacture and distribution of cement, and until recently was assistant to the president of the Monolith company. Another is J. Fred Larson, formerly in the real estate business in Portland, and who for the past several years has been an importer and exporter at Astoria, Ore., and other points along the Pacific coast. J. L. Jennings, ex-president of the Marine Iron Works, is another member of the concern, and still another is Judge Arthur Langguth, one of the leading attorneys of Portland.

For four months representatives of the company have been making their plans for the plant, which will have an initial capacity of 3000 bbl. of cement a day. These men expressed the belief that the plant would be able to start making cement shipments in eight months. Plans for a pier indicate the company will seek outside as well as local business.—*Portland* (Ore.) *Oregonian.*

Blasting Accident at Concrete, Wash., Kills One and Injures Five

PREMATURE EXPLOSION of two tons of dynamite in the Superior Portland Cement Co. quarry at Concrete, Wash., blew one man to bits and critically injured six others.

The unexpected detonation occurred in the midst of preparations for a huge blast of 20 tons of explosives, which was to have been set off the following day.

Fred Baker, 32 years old, of the E. I. du Pont de Nemours Co., was killed. Fred Heck, 29, employe of the cement company; William Doyle, 30, employe of the cement company; Wallace C. White, 24, du Pont company representative, are not expected to live. Those critically hurt were Guy Frank, 32, cement company employe, and Pete Magis, 34, cement company employe.

The accident occurred when the charges being tamped into two of the twenty 190-ft. deep holes exploded without warning. Approximately a ton of explosive was in each of the two holes. It had been expected to set off more than twenty tons at one time in the anticipated blast.

The regular blast, which has now been indefinitely postponed as the result of the accident, was planned to loosen 200,000 tons of rock. The blasting operations were being directed by officials of the du Pont powder company.

Elaborate plans of Fox Movietone to take "talkies" and moving pictures of the event, declared to be the biggest quarry blast ever planned in the Pacific Northwest, had to be abandoned.

To Develop Quarries Near Greenfield, Ohio

A COMPANY to be known as Blue Rock, Inc., has acquired the Ersa Beatty farm along the D. T. and I. railroad north of Greenfield, Ohio, and will open a new quarry and crushing plant for road material. J. W. Barker, Lynchburg, Ohio, is one of the organizers of the new enterprise.

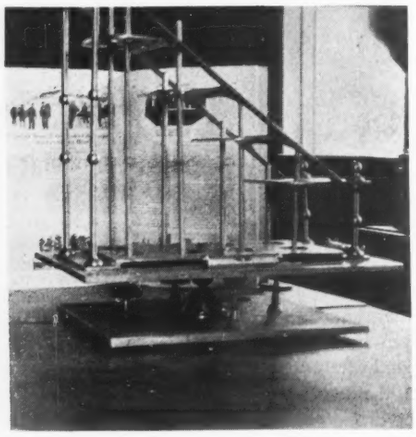
The D. T. and I. is now extending a siding into the quarry, and within a short time it is planned to produce 400 tons of stone daily.

The project has been under consideration for the past year or more.—*Washington* (Ohio) *Herald.*

Hints and Helps for Superintendents

Seismograph for Quarries

SEISMOGRAPH is probably not the correct term for the instrument illustrated because it does not record vibrations—it merely proves or disproves their intensity. This device, readers will recall, was developed by the General Crushed Stone Co. and first used at its Winchester, Mass., quarry, where extensive investigations were carried out to determine the amount or intensity of earth vibrations caused by well-drill-hole blasting. These investigations have been described in ROCK PRODUCTS and in the *Transactions* of the National Crushed Stone Association.



Seismograph for quarries

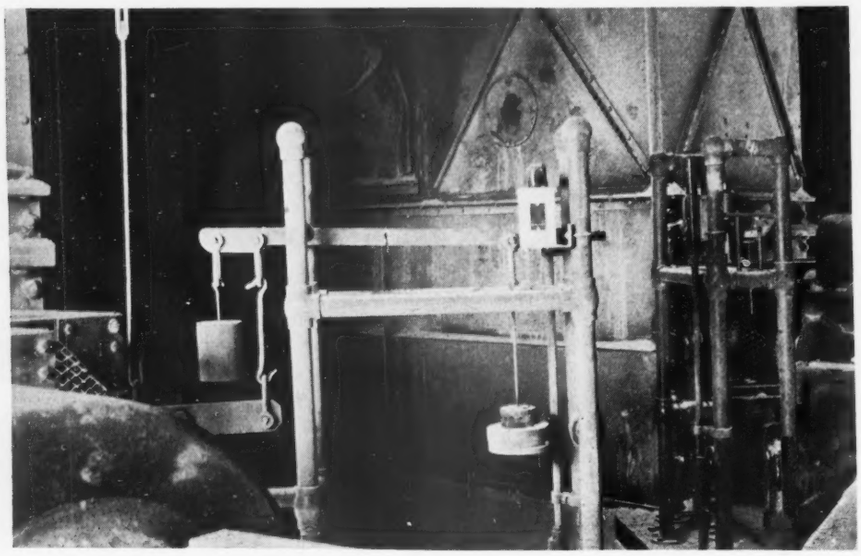
The instrument illustrated was designed and built under the supervision of F. H. Edwards, general superintendent of the Connecticut Quarries Co., New Haven, Conn., by a local machine shop. It is the most elaborate of its type we have seen. It is built entirely of steel and brass, has four leveling screws and two spirit levels.

As the reader will doubtless recall, from previous articles, the pins are of different heights and slight jars, or vibrations, will cause them to tip over, the tallest of course tipping the easiest.

At several quarries now these are used whenever blasting is done; and a record is kept of the pins which toppled over, if any did. The mathematics have been worked out by specialists for the General Crushed Stone Co., and will be found in the *Transactions,* so that the data furnished by these instruments prove very helpful in lawsuits involving alleged damage to houses and structures from quarry blasts.

Batch Control Apparatus

THE ILLUSTRATION herewith shows a clever device worked out at the lime plant of the Chazy Marble Lime Co., Chazy, N. Y., to feed the Weber hydrators predetermined amounts of crushed lime and to control the feed of crushed lime to the weighing hoppers. A standard General-Electric float switch is attached to a beam scale. This switch automatically shuts off the elevator that feeds the hydrator weighing hopper, when it has the necessary charge, and diverts the flow to the hopper feeding the other hydrator; or if only one hydrator is in use, or if both hoppers are full, it automatically shuts down the feed elevator. The feed tanks or hoppers are hung on the scale levers, giving accurately weighed batches of lime to the hydrator, which is of the batch type. D. K. Evans is manager of the plant and Clyde Cook, superintendent.



Apparatus controls batch feeding of lime to hydrators and weigh hoppers

Pipe Line Pontoons

THE Lyman-Richie Sand and Gravel Co.'s operation near Fremont, Neb., uses suction dredges for recovery of sand and gravel. Its practice, as regards installing the pipe line from the dredge to the screening plant, consists of using welded tubing, suitably flanged. These are connected in a single solid line from the shore to within a few feet of the dredge. Both at the shore line and at the dredge a short length of flexible rubber dredge sleeve is used to take up any side movements. The 10-in. pipes are all floated on pontoons made up of 15 empty 50-gal. oil drums, five of the drums being lashed as shown in the cut with three of

Simple pipe line pontoons

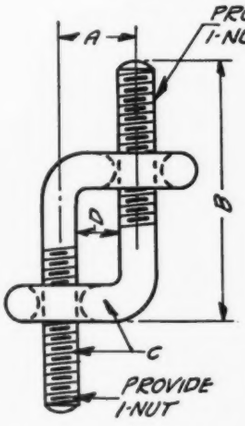
these sets further lashed together in the form of a square to constitute a pontoon. The pontoons are spaced at about 28 ft. centers.

The method of connecting the pipe line is quite unusual, for most operators use a rubber dredge sleeve at every joint. The company has found the above method quite satisfactory even under extremely windy conditions.

Efficient Clamp for Wire Ropes

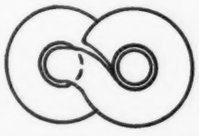
By J. J. GRIERSON
Engineer, Noarlunga Sand Co., Ltd., Seacliff, South Australia

THE ACCOMPANYING sketch gives the construction details of a simple and efficient clamp for wire rope. This is a



	FOR ½" ROPE	FOR ¾" ROPE
A	1"	1⅜"
B	3"	3¾"
C	½" ROUND M.S.	⅝" ROUND M.S
D	½"	¾"

Construction details of an efficient wire rope clamp



clamp type which I have used with success for several years; it will not slip and can be made by any ordinary blacksmith or handy man. It consists of two ordinary bolt ends, the straight end that is not screwed having a loop formed and bent over at right angles. One is threaded through the other and the rope placed between, at the point marked "D" on sketch enclosed. I have used this extensively on aerial ropeways, mining haulages and have used them on ropes up to 1¼-in. in diameter and have never had any fail.

Dust Shields on Rotary Screens

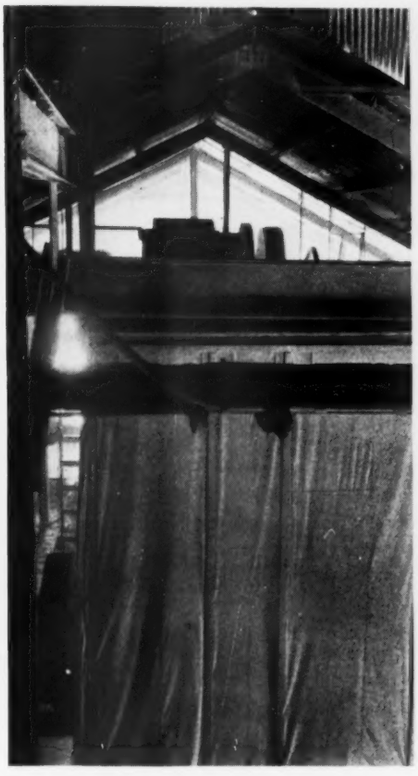
AT THE Greencastle, Ind., plant of the Midwest Crushed Stone Co. all the rotary screens are enclosed in cloth housings which act to confine and retain the dust. These curtains are suspended from convenient places and the spaces thus formed, connected to a suitable fan for dust recovery. The installation gives a clean plant, eliminating most of the dust hazards to equipment and men.

Traffic Hints

THE DIFFERENCE between success and failure of a sand and gravel company was determined by the location of the plant with respect to a railroad. At the first operation, the trucks delivering to the downtown sections had to cross these tracks, resulting in the company's going bankrupt, as truck drivers preferred more advantageously located plants. Later the company reorganized and chose a more suitable site, and became highly successful.

The manager's eyes were opened to questions of traffic, and before locating his second plant, he had a survey made showing the routes to various proposed plants from all probable districts he wished to serve. Each map showed the actual time required to drive over a given route, the number of street intersections controlled by lights, number of railroad crossings, street car lines and comparative data from competitive plants.

Nothing was left to guesswork. The manager could tell from streets maps just what delays a truck going and coming could expect, not only to his own plant, but his competitor's who might serve the same territory. The result was that his company chose a site for its plant that put it on the road to success.



Rotary screens are enclosed in dust curtains

Now please don't wire in and ask for the name of this manager, as it really is only a hypothetical company, but if you don't know traffic conditions in the vicinity of your plant, perhaps this little tale will remind you to look into the matter before you locate.

Preventing Aggregates from Segregating

AT the Schoenfield Quarries, Inc., near San Antonio, Texas, the problem of preventing segregation of the aggregates has been simply solved by mounting a flexible spout to a small light car that runs on indus-

Device which prevents aggregates from segregating during car loading

trial rails immediately below the different bin gates. This spout is moved from bin to bin as desired and the operator swings the spout back and forth across the car while loading. This device also insures uniform distribution of material in the car.

Some Don'ts in Drilling Blast Holes

DON'T DRILL with too slack a line in using wire rope. You are liable to break off the cable at the top of the socket.

Don't neglect to keep the drill rig well lubricated. Oil is the cheapest insurance you can buy.

Don't use drill bits with a thick center section. It retards the drop and necessitates running the bailer more often.

Don't run a rope or cable until it is almost worn out. You may leave your tools in the hole.—*Armstrong Driller.*

Adherence to Published Prices

"THE FEDERAL TRADE COMMISSION, through approving the open publication and circulation of prices to the trade and in approving a single closed bid, has paved the way for the elimination of the Oriental method of individual barter and haphazard dickering in individual transactions." This statement was made by Arthur Fisher of Chicago at the semi-annual meeting of the Concrete Reinforcing Steel Institute, held last week at Wawasee, Ind.

Mr. Fisher stressed particularly the trade practice conference rules approved by the Federal Trade Commission following the trade practice conference held by the industry at Asheville last April. Mr. Fisher said:

"Under precedents established by trade practice conference rules approved by the Federal Trade Commission in recent months in the case of four important American industries, this association of reinforcing steel fabricators and distributors may, in my opinion, now safely require the publication of prices by each of its members. Industries in which rules with reference to the publication of prices have recently been promulgated by the commission include not only the reinforcing steel industry itself but also such other groups as petroleum refining and distributing of scrap iron and steel.

"Your industry may also now take the position that any departure from published prices until after those prices have been publicly withdrawn and new prices published and circulated is an unfair and improper trade practice.

"While this trade practice is not to be construed in any sense as justifying any agreements between competitors with reference to uniform prices, the natural effect of the open publication of prices is to stabilize a market on the basis of broader considerations of an economic character, rather than on the basis of individual barter and unrevealed and ill-considered dickering in individual transactions. The open publication and circulation of prices to the entire trade and the public is essential to give real value to cost studies such as those which have been widely encouraged and developed under the leadership of the Department of Commerce during the period of President Hoover's secretaryship. This is particularly true in a building industry where each job is in a sense unique."

General Decrease in City Building Operations

OFFICIAL REPORTS from 596 leading cities and towns in every part of the United States made to S. W. Straus and Co. showed a total of building permits issued in September of $218,344,506 compared with $251,193,426 in September last year. The loss from August was 13% and from September, 1928, was 20%. The figures were without special significance, excepting that they indicated a continuation of the downward trend in urban building activities that has been in existence throughout the greater part of the year.

A study of the reports reveals that the losses were fairly well scattered throughout the country with no acute falling off in any particular section. To a large extent the decline is in smaller types of construction.

It is to be noted that the decline in the largest centers of population was somewhat greater than in the smaller cities. For example, building permits issued in the 15 largest cities totaled $96,920,607 compared with $136,107,473 in September, 1928, a loss of 29%. The heaviest falling off in this group was in New York, Chicago, Philadelphia, Boston and Baltimore.

Contractors' View of Building Material Dealers and Producers

(An editorial in *The Constructor*, official journal of the Associated General Contractors of America.)

THE AIMS AND ASPIRATIONS of organized constructors are peculiarly subject to misinterpretation when they seek more effective methods of exercising their buying power. Material manufacturers in some lines are prone to feel that their own merchandise policies are of concern to none but themselves. Dealers appear to have an inherent distrust of organized contractors when they evince an inclination to discuss buying methods. Contractors are often somewhat hazy about the relative parts played by manufacturer, distributor and constructor.

Hence the question of the relative positions of dealers and constructors in the merchandising structure of the industry is one that needs intelligent review and revision. The policy which animates constructors is not inimical to the dealer. It is based on the proposition, however, that no group in the industry is entitled to levy tribute against construction materials unless a distinct service has been performed in the merchandising or handling of those materials.

When a contractor buys material direct from a manufacturer, has that material delivered direct in cars either to his own yard or to his construction operation it is difficult to see the justification for the payment of a tax to local dealers who exerted themselves no whit to secure the order and have not seen nor handled any part of the material. Collections are likewise no concern of the dealer under such arrangements and he plays no part whatever in initiating, serving or in winding up the transaction.

The dealer is, however, an essential part of the merchandising system of manufacturers of materials. Because he is indispensable for the securing of retail outlets he is in a position to insist on being given a commission on all business originating in his territory. His argument is that being the representative of the manufacturer locally he is engaged in introducing the product, developing interest in it and creating a demand.

If through his efforts a definite demand is created for the materials he works to introduce he claims a regular commission on the sale regardless of the quantities involved or whether the customer buys direct from the manufacturer or not.

Constructors have never questioned the right of a dealer to have his commission on any sale of material in which he plays a part or serves a function. Throughout the industry the whole question resolves itself as to whether the securing of an agency to handle certain materials in itself constitutes a service for which the direct purchaser should be taxed. If this question can by any chance be settled in the affirmative, then the question arises as to how much the direct buying, quantity purchaser of materials can justiably be assessed in order to compensate for the real or theoretical services which the control of a local sales agency implies.

On this latter point as well as on the first, there is wide disagreement. Dealers usually insist upon securing the full retail commission on all products sold in the territory they are supposed to do business in regardless of origin of sale, quantity purchased, method of delivery or responsibilty for collections. Obviously this is stretching the claims for service to an undue extent.

The Associated General Contractors recognizes the futility of any program to do away with dealers or to infringe upon their justifiable prerogatives. It seeks at all times to cooperate with them for the promotion of sound merchandising policies wherein the dealer may play his part and receive adequate compensation for the service he renders. It insists, however, that those merchandising policies which are detrimental to the general contractor or which make no provision for his needs or welfare are as detrimental to sound merchandising as similar policies which ignore the dealer or force him to do missionary work for commodities without compensation.

The real solution to the situation can come about only through fair and above board discussion of the entire problem in three cornered conferences. As on many other questions about which the A. G. C. has had to take the lead, it appears that the original resistance or antagonism to this program is giving way in some quarters. The A. G. C. aims to further the development of an equitable and sound merchandising structure within the industry just as it intends that there shall be a sound credit structure, a sound system of awarding construction contracts, of writing surety bonds and of selecting responsible contracting firms to submit bids.

Editorial Comment

Current Prices of Rock Products

In this issue readers will find our quotations of current prices of rock products considerably abbreviated. Our reason for this is that we have found upon inquiry that the prices being quoted in previous issues were not in many cases the actual prices for which the material was being sold. Hence we have eliminated all quotations which are, in any way, we believe, open to question. We are not cutting down the number of these quotations to save space, much as we would like to have more space for articles, because we are convinced that this "current prices of rock products" department is and has been a distinctive and helpful service to producers.

In getting these quotations we have always taken the initiative and mailed blanks to producers, with return postage paid. These blanks are mailed so that every producer quoting gets a new blank every six weeks. Many of these have been conscientiously filled out and returned, and for this assistance and co-operation ROCK PRODUCTS is duly grateful.

There are several instances where these price quotations have become matters of court record, and in these instances they have been very valuable to producers in establishing the price of a commodity in a certain place at a certain time, and also in helping to defend certain producers' prices when they were alleged to be unfair, by proving that these prices were approximately the same, or lower, than prices for the same commodity in other localities.

Primarily these price quotations are for the information of producers only, to permit them to know what other producers are asking and getting, and to give them the moral courage to ask a fair and profitable price. Obviously, these quotations serve that purpose only so long as they are honest and true price quotations. In times of overproduction there is much price-cutting that producers do not care to expose, under present methods of doing business, more's the pity! Then our price quotations become a detriment to the industry, rather than a help, because they give the uninitiated the impression that prices are higher than they really are, and lead to the conclusion that there are profits in the industry which actually are not there. Under the circumstances, we have decided it is better to have a few *bona fide* quotations than many questionable ones.

We are desirous, however, of quoting honest and real prices in many other localities than those listed in this issue and we earnestly solicit the co-operation of our subscribers to obtain such quotations. The day is fast coming when a producer will post his price and consider it unethical and dishonorable to depart from his published price without having notified the industry of that change. There is now law now to prevent a producer adhering to his published price, and the code of trade practices of some associations tend to require this, with the tacit approval of Federal Trade Commission.

This is an opportunity for genuine service to its industry that ROCK PRODUCTS has recognized for over ten years, for only an independent medium such as ROCK PRODUCTS can legitimately collect and disseminate such quotations. A trade or industrial association, under the present interpretation of the anti-trust laws, cannot do so without risk of prosecution. A newspaper medium such as ROCK PRODUCTS can do so legitimately because its quotations are, theoretically at least, as open to the consumer or user as to the producer, and we cannot be accused of being in any conspiracy with producers so long as we get these quotations openly by our own initiative and make them public without comment.

So again we ask our subscribers for their whole-hearted assistance that we may render the industry a service that each and every reader must recognize as possible—indeed one that we have proved by ten years' practice is practicable—and the usefulness of such a service is bound to increase as time goes on and more ethical methods of doing business gain greater currency.

Some Cement Manufacturing Statistics

Usually statistics are dry reading, but those quoted below are interesting and instructive because they are an index of the evolution taking place in the cement industry, and to a lesser extent in all the rock products industries. The *increase* in the number of portland cement plants (U. S. Bureau of Census Reports) between 1919 and 1927 was 30.9%; the *increase* in production was 114%; the *increase* in the number of wage earners was 42.3%; the *increase* in the amount of wages was 60%; the *increase* in the cost of materials, supplies, fuel and power was 50.9%; the *increase* in the value of the product was 67.5%; the *increase* in value added by manufacture was 81.2%, and the *increase* in horsepower provided was 118.8%.

According to our computations there was a saving in labor between 1919 and 1927 of approximately one-third, or 33%, in man hours employed (or 25% in labor cost) to make a barrel of cement, a saving in materials, fuel and power costs of 28½% per bbl., but the amount of power to make a barrel of cement remained practically constant.

This may be accounted for in several ways. Undoubtedly a finer ground product was more general in 1927 than in 1919, but it also shows that much more progress has been made in labor-saving through more nearly automatic operation of plants than in real mechanical efficiency—that is, efficiency of processing. Undoubtedly with modern machinery a much less amount of power is lost in transmission equipment, such as belts and gears; but there is still a wide-open field for actual reduction of power, such as has already been accomplished in the case of labor.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[29]	10-23-29	91	93	
Alpha P. C. new com.	10-21-29	29	29¾	75c qu. Oct. 15
Alpha P. C. pfd.	10-21-29	116	.....	1.75 Sept. 14
American Aggregates com.[29]	10-23-29	20	30	75c qu. Mar. 1
Amer. Aggregate 6's, bonds	10-22-29	93	.....	
American Brick Co., sand-lime brick	10-21-29	.....	14	25c qu. Feb. 1
American Brick Co. pfd., sand-lime brick	10-21-29	.....	80	50c qu. Aug. 1
Am. L. & S. 1st 7's[28]	10-23-29	96	98	
American Silica Corp. 6½'s[19]	10-23-29	90	100	
Arundel Corp. new com.	10-22-29	42⅞	43¼	50c qu. Oct. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	10-23-29	No market		
Atlas P. C. com.	10-21-29	37	40	50c qu. Sept. 3
Beaver P. C. 1st 7's[20]	10-17-29	97	100	
Bessemer L. & C. Class A[4]	10-19-29	30½	31½	75c qu. Nov. 1
Bessemer L. & C. 1st 6½'s[4]	10-19-29	90	92	
Bloomington Limestone 6's[29]	10-23-29	86	87	
Boston S. & G. new com.[47]	10-21-29	18	21	40c qu. July 1
Boston S. G. new 7% pfd.[47]	10-21-29	48	52	87½c qu. July 1
Calaveras Cement 7% pfd.	10-19-29	86¾	87½	
Calaveras Cement com.	10-19-29	18½	19	
Canada Cement com.	10-22-29	.....	23½	
Canada Cement pfd.	10-22-29	95	96	1.62½ qu. Sept. 30
Canada Cement 5½'s[43]	10-19-29	97½	98¼	
Canada Cr. St. Corp. 1st 6½'s[43]	10-19-29	94	98	
Can. Gyp. & Alabastine (new)	10-22-29	25½	26	37½c Oct. 1
Certainteed Prod. com.	10-22-29	21	23	
Certainteed Prod. pfd.	10-22-29	60	68	1.75 qu. Jan. 1
Cleveland Quarries new st'k	10-22-29	64	70	50c&25c ex. Sept. 1
Columbia S. & G. pfd.	10-21-29	86½	90	
Consol. Cement 1st 6½'s, A[42]	10-23-29	90	.....	
Consol. Cement 6½% notes[24]	10-23-29	85	90	
Consol. Cement pfd.[29]	10-23-29	50	60	
Consol. Oka S. & G. 6½'s[12] (Canada)	10-19-29	100	102	
Consol. Rock Prod. com.[9]	10-17-29	.....	10	
Consol. Rock Prod. pfd.[20]	10-17-29	19	20	
Consol. Rock Prods. units[20]	7-27-29	52	53	
Consol. S. & G. pfd. (Can.)	10-22-29	.....	88	1.75 qu. Aug. 15
Construction Mat. com.	10-21-29	19¾	21	
Construction Mat. pfd.	10-22-29	39	40	87½c qu. Nov. 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[18]	10-17-29	94	98½	
Coosa P. C. 1st 6's[29]	10-23-29	50	55	
Coplay Cem. Mfg. 1st 6's[40]	10-21-29	90	.....	
Coplay Cem. Mfg. com.[40]	10-21-29	10	.....	
Coplay Cem. Mfg. pfd.[40]	10-21-29	70	.....	
Dewey P. C. 6's[30] †(1942)	10-23-29	100	.....	
Dewey P. C. 6's[30] (1930)	10-23-29	97	.....	
Dewey P. C. 6's[30] (1931-41)	10-23-29	95½	.....	
Dolese & Shepard	10-22-29	105	110	
Edison P. C. com.[39]	10-21-29	10c	.....	
Edison P. C. pfd.[39]	10-21-29	25c	.....	
Giant P. C. com.[2]	10-21-29	.....	30	
Giant P. C. pfd.[2]	10-21-29	.....	20	3½% s.-a. June 15
Ideal Cement, new com.[33]	10-19-29	61	64	75c qu. Oct. 1
Ideal Cement 5's, 1943[33]	10-19-29	97	100	
Indiana Limestone units[29] (5 shs. com. & 1 sh. pfd.)	10-23-29	90	.....	
Indiana Limestone 6's	10-22-29	79¾	.....	
International Cem. com.	10-22-29	61½	62	$1 qu. Sept. 27
International Cem. bonds 5's	10-22-29	96¾	.....	Semi-ann. int.
Iron City S. & G. bonds 6's[46]	9-20-29	85	90	
Kelley Is. L. & T. new st'k	10-22-29	48	50	62½c qu. Oct. 1
Ky. Cons. St. com. Voting Trust Certif.[48]	10-18-29	12	13½	
Ky. Cons. Stone 6½'s[48]	10-18-29	96	100	
Ky. Cons. Stone pfd.[48]	10-18-29	90	95	
Ky. Cons. Stone com.[48]	10-18-29	12	13½	
Lawrence P. C.	10-21-29	55	70	$1 qu. Sept. 28
Lawrence P. C. 5½'s, 1942	10- 9-29	84	90	
Lehigh P. C.	10-22-29	36½	39	62½c qu. Nov. 1
Lehigh P. C. pfd.	10-22-29	106	107	1¾% qu. Oct. 1
Louisville Cement	10-22-29	250	.....	
Lyman-Richey 1st 6's, 1932[13]	10-18-29	97	99	
Lyman-Richey 1st 6's, 1935[13]	10-18-29	96	98	
Marblehead Lime 6's[14]	10-18-29	98	100	
Material Service Corp.	10-22-29	29	31	50c qu. Sept. 1
Medusa Portland Cem.[28]	10-23-29	120	123	1.50 Oct. 1
Mich. L. & C. com.[6]	10-21-29	35	.....	
Missouri P. C.	10-22-29	36½	37	50c qu., 50c ex. Nov. 1
Monolith Midwest[9]	10-17-29	8½	10	
Monolith bonds, 6's[9]	10-17-29	97	98	
Monolith P. C. com.[9]	10-17-29	13½	14	40c s.-a. July 1
Monolith P. C. pfd.[9]	10-17-29	9	9½	40c s.-a. July 1
Monolith P. C. units[9]	10-17-29	31½	33	
National Cem. (Can.) 1st 7's[29]	10-23-29	94	98	
National Gypsum A com.	10-22-29	12	14	
National Gypsum pfd.	10-22-29	48	51	
Nazareth Cem. com.[26]	10-19-29	15	25	
Nazareth Cem. pfd.[26]	10-19-29	95	100	
Newaygo P. C. 1st 6½'s[29]	10-23-29	101½	.....	
New Eng. Lime 1st 6's[14]	10-18-29	95	98	
N. Y. Trap Rock 1st 6's	10-22-29	95¾	.....	
North Amer. Cem. 1st 6½'s	10-22-29	56⅞	.....	
North Amer. Cem. com.[29]	10-23-29	3	7	
North Amer. Cem. 7% pfd.[29]	10-23-29	.....	29	1.75 qu. Aug. 1
North Amer. Cem. units[29]	10-23-29	.....	33	
North Shore Mat. 1st 5's[15]	10-23-29	.....	94	
Northwestern States P. C.[37]	7-26-29	140	.....	2% Oct. 1
Ohio River Sand com.	10-21-29	28½	30	
Ohio River Sand 7% pfd.	10-21-29	100	102	
Ohio River S. & G. 6's[16]	10-23-29	90	95	
Pac. Coast Agg. 6½'s	8-29-29	99	.....	
Pac. Coast Agg. 7's	8-29-29	99	.....	
Pac. Coast Cem. 6's, A[5]	10-17-29	.....	95	
Pacific Lime Co. pfd.[43]	9- 6-29	No market		
Pacific P. C. com.	10-19-29	25	.....	
Pacific P. C. pfd.	10-19-29	77	80	1.62½c qu. Oct. 5
Pacific P. C. 6's[5]	10-17-29	99¼	100	
Peerless Egyp'n P. C. com.[21]	10-21-29	1¾	2½	
Peerless Egyp'n P. C. pfd.[21]	10-21-29	84	88	1.75 Oct. 1
Penn-Dixie Cem. 1st 6's	10-22-29	71	72	
Penn-Dixie Cem. pfd.	10-22-29	38	40	1.75 qu. Sept. 15
Penn-Dixie Cem. com.	10-22-29	8	9	
Penn. Glass Sand Corp. 6's	10- 9-29	100	101	
Penn. Glass Sand pfd.	10- 9-29	115	.....	1.75 qu. Oct. 1
Petoskey P. C.	10-22-29	9½	10	1½% qu. Sept. 1
Riverside P. C. com.	10-19-29	.....	25	
Riverside P. C. pfd.[9]	10-17-29	87½	90	1.50 qu. Nov. 1
Riverside P. C., A[9]	10-17-29	15	17	31¼c qu. Nov. 1
Riverside P. C., B[9]	10-17-29	5	.....	
Santa Cruz P.C. 1st 6's, 1945	10-19-29	108½	.....	6% annually
Santa Cruz P. C. com.	10-19-29	95	.....	$1 qu. Oct. 1
Schumacher Wallboard com.	10-19-29	13	.....	
Schumacher Wallboard pfd.	10-19-29	24½	.....	50c qu. Aug. 15
Southwestern P. C. units[44]	10-17-29	270	.....	
Standard Paving & Mat. (Can.) com.	10-22-29	29	30	50c qu. Aug. 15
Standard Pav. & Mat. pfd.	10-22-29	91	.....	1.75 qu. Aug. 15
Superior P. C., A	10-19-29	.....	42½	27½c mo. Oct. 1
Superior P. C., B	10-19-29	.....	19	
Trinity P. C. units[37]	7-26-29	142	150	
Trinity P. C. com.[37]	7-26-29	51	.....	
Trinity P. C. pfd.[29]	10-23-29	110	115	
U. S. Gypsum com.	10-22-29	75½	76	2% qu. Sept. 30
U. S. Gypsum pfd.[29]	10-23-29	.....	106	1¾% qu. Sept. 30
Universal G. & L. com.[9]	10-23-29	No market		
Universal G. & L. pfd.[8]	10-23-29	No market		
Universal G. & L., V.T.C.[8]	10-23-29	No market		
Universal G. & L. 1st 6's[8]	10-23-29	No market		
Warner Co. com.	10-21-29	47	50	50c qu., 50c ex. Oct. 15
Warner Co. 1st 7% pfd.	10-21-29	101	103½	1¾% qu. Oct. 1
Warner Co. 1st 6's[8]	10-23-29	98½	101	
Whitehall Cem. Mfg. com.[38]	10-21-29	125	.....	
Whitehall Cem. Mfg. pfd.[38]	10-21-29	98	.....	
Wisconsin L. & C. 1st 6's[15]	10-23-29	94	.....	
Wolverine P. C. com.	10-22-29	4	5	15c qu. Nov. 15
Yosemite P. C., A com.[9]	10-17-29	4	5	

†$484,000 called for redemption at 103½ October 1.

[1]Quotations by Watling Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by Rogers, Tracy Co., Chicago. [4]Quotations by Butler Beadling & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Dillon, Read & Co., Chicago, Ill. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbit, Thomson & Co., Montreal, Canada. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Peters Trust Co., Omaha, Neb. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co., of Illinois, Chicago. [16]J. S. Wilson Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hoit, Rose & Troster, New York. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simons & Co., Inc., Detroit, Mich. [22]Hemphill, Noyes & Co., New York City, N. Y. [23]Blair & Co., New York and Chicago. [24]A. B. Leach & Co., Inc., Chicago. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [32]A. E. Ames & Co., Toronto, Can. [33]Boettcher Newton & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [38]McFetrick & Co., Montreal, Que. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [41]Hornblower & Weeks, New York City and Chicago. [42]E. H. Rollins, Chicago, Ill. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Inc., Los Angeles, Calif. [45]Taylor Ewart & Co. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Wise, Hobbs & Arnold, Boston. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
American Brick Co. com., 20 sh.[8]	$10 per share	.....
American Brick Co. pfd., 20 sh.[8] (par $25)	$18 per share	.....
International Portland Cement Co., Ltd., pfd.	30	45
New England Lime Co. Series B, 60 sh.[9]	$15 per share	.....
Rockland & Rockport Lime Co. 2nd pfd.[7] 13½ sh.	2⅞ per snare	.....
Rockland & Rockport Lime Co. com.[7] 14½ sh.	55c per share	.....
Seaboard P. C.[1] 6% bonds ($7.500) 7-1-27. July, 1910. and subsequent coupons attached	$10 for the lot	...

Stock	Price bid	Price asked
Southern Phosphate Co.[6]	1¼	.....
Universal Gypsum com. free stk.[1] 300 shares	$75 for the lot	.....
Universal Gypsum com.[1] 153 shares (no par)	$51 for the lot	.....
Vermont Milling Products Co. (slate granules). 22 sh. com. and 12 sh. pfd.[6]	$1 for the lot	.....
Winchester Rock Brick Co., pfd., 1 share (par $25) and 1 share com. (par $10)[6]	$8 for the lot	

[1]Price obtained at auction by Adrian H. Muller & Sons, New York. [7]Price obtained at auction by R. L. Day & Co., August 21, 1929. [8]Price at auction by Wise, Hobbs & Arnold, Boston, October 16. [9]Price at auction by R. L. Day & Co., Boston, October 16.

International Cement Earnings for Three Quarters

INTERNATIONAL CEMENT CORP. reports for the quarter ended September 30 consolidated net income of $1,360,356 after interest, depreciation and reserve for federal taxes and contingencies, equal to $2.20 a share on the 619,049 common capital shares outstanding. This compares with $1,149,789 in the preceding quarter, or $1.86 a share on the 619,031 common shares then outstanding and with $1,417,916 in the corresponding quarter of 1928 or $2.29 a share on the 618,826 common shares then outstanding.

Consolidated net income for the nine months ended September 30 was $3,527,764 or $5.70 a share on the outstanding capital shares against $3,614,375 in the similar period of 1928, equal after dividends on the preferred stock then outstanding (preferred stock called for redemption May, 1928) to $5.43 a share on the outstanding common shares.

Consolidated net income account for the third quarter compares:

	1929	1928	1927
Gross sales	$10,377,104	$10,209,715	$8,291,489
Discounts, etc.	2,166,606	2,032,455	1,600,111
Manufacturing costs	4,085,503	4,296,336	3,549,168
Depreciation	863,371	616,818	521,481
Expenses	1,410,426	1,395,870	1,118,113
Interest	174,241	107,643	4,638
Federal tax reserve, etc.	316,602	342,677	263,005
Net income	$1,360,356	$1,417,916	$1,234,973
For the nine months ended September 30, 1929:			
Gross sales	$26,929,928	$25,673,285	$22,131,615
Discounts, etc.	5,549,079	5,022,491	4,244,794
Manufacturing costs	10,659,525	10,655,956	9,549,823
Depreciation	1,932,654	1,608,917	1,315,885
Expenses	3,895,500	3,687,248	3,063,136
Interest	511,078	277,645	5,938
Federal tax reserve, etc.	854,328	806,655	760,522
Net income	$3,527,764	$3,614,375	$3,283,518

Penn.-Dixie Cement Statement for Year Ending September 30

REPORT of Pennsylvania-Dixie Cement Corp. and subsidiaries for 12 months ended September 30, 1929, shows consolidated net profit of $686,072 after depreciation, depletion, interest and federal taxes, equivalent to $5.05 a share on 135,888 shares of 7% preferred stock.

The company's officials state that there has been an increase in sales volume recently, but continued price reductions by competing companies has seriously affected earnings. Prices in the east were recently reduced 20 to 30 cents a barrel, the most drastic reduction in recent years, and in the midwest 25 to 30 cents. During the 12 months reported prices have been reduced 25 cents a barrel in the southwest. Foreign cement continues to have a serious adverse effect on the domestic industry.

As of September 30, Pennsylvania-Dixie's ratio of current assets to current liabilities stood at 11 to 1.

Consolidated income account for 12 months ended September 30, 1929, follows: Operating profit, $2,930,414; depreciation and depletion, $1,397,257; interest, $710,980; federal taxes, $136,106; net profit, $686,072.

Consolidated balance sheet of Pennsylvania-Dixie Cement Corp. and subsidiaries as of September 30, 1929, compares as follows:

Bankers' Comment on Portland Cement Situation

DECIDEDLY UNSATISFACTORY conditions obtain in several of the building material lines. The cement industry is in a particularly difficult position due mainly to excessive plant capacity and price cutting. For some time many of the smaller producers have been making concessions on prices in the attempt to keep up their volume and leading concerns have been obliged to meet this competition.

Reductions of 20 to 30 cents per bbl. have recently become effective in the eastern and mid-western districts. Present prices stand at an average of about $2.15 per bbl. against $2.28 a year ago. Price cutting has been the most severe along the Atlantic seaboard owing to the competition of cement imported from Belgium.

Present cement prices in many cases hardly cover operating expenses and some plants will probably be shut down. Margins are very narrow even for the most efficient producers.—*Business and Financial Comment* by the First Wisconsin National Bank, Milwaukee, Wis.

CONSOLIDATED BALANCE SHEET, PENNSYLVANIA-DIXIE CEMENT CORP., AS OF SEPTEMBER 30, 1929

ASSETS

	Sept. 30, '29	Dec. 31, '28	Dec. 31, '27	Dec. 31, '26
†Land, buildings, machinery and equipment	$25,480,849	$26,511,046	$26,414,798	$26,233,241
Cash	2,332,997	1,573,126	2,949,881	3,454,999
Notes and accounts receivable	1,419,154	1,365,536	849,015	1,054,397
Inventories	2,710,614	3,394,902	2,964,915	2,704,145
Miscellaneous investments	84,100	115,600	118,500	120,500
Insurance fund	35,000	35,000	35,000	30,000
Deferred charges	85,959	38,192	37,290	79,878
Total	$32,148,673	$33,033,402	$33,369,399	$33,677,160

LIABILITIES

Preferred stock	$13,588,800	$13,588,800	$13,000,000	$13,000,000
*Common stock	4,000,000	4,000,000	4,000,000	4,000,000
Gold bonds	11,789,000	11,920,000	12,442,000	12,468,000
Notes payable				66,821
Accounts payable	166,756	332,857	194,059	156,278
Accrued taxes, interest, etc.	214,845	414,181	359,872	427,340
Dividends declared			200,000	
Federal tax reserve	164,459	283,900	374,746	700,220
Other reserves	205,637	178,200	542,022	67,523
Surplus	2,019,176	2,315,464	2,256,700	2,790,978
Total	$32,148,673	$33,033,402	$33,369,399	$33,677,160

*Represented by 400,000 no-par shares. †After depreciation and depletion.

Alpha Portland Cement Earnings

ALPHA PORTLAND CEMENT CO., Easton, Penn., reports for the 12 months ended September 30, 1929, net income of $1,989,345 after all charges and federal taxes, equal after preferred dividends to $2.60 a share on the 711,000 shares of no par common stock outstanding.

The company's statement for 12 months ended September 30, 1929, shows net income of $1,989,345 after depreciation, federal taxes, etc., equivalent after 7% preferred dividend requirements, to $2.60 a share on 711,000 no-par shares of common stock.

Income account for 12 months ended September 30, 1929, follows: Net sales, $12,373,664; operating expenses, $9,132,009; operating profit, $3,241,655; other income, $288,815; total income, $3,530,470; depreciation, $1,266,721; estimated federal taxes, $274,404; net income, $1,989,345; preferred dividends, $140,000; common dividends, $2,133,000; deficit, $283,655.

Consolidated balance sheet of the Alpha Portland Cement Co. as of September 30, 1929, compares as follows:

ASSETS

	Sept. 30, '29	Dec. 31, '28
Property account	$22,236,204	$22,552,772
Cash	2,938,157	2,585,988
Call loans	2,600,000	2,800,000
U. S. government bonds	1,357,975	1,357,975
Working funds and advances	155,754	186,744
Accounts and notes receivable	1,095,466	557,110
Inventories	2,485,053	2,848,269
Miscellaneous investments	220,967	212,166
Deferred charges	335,289	367,063
Total	$33,424,865	$33,468,087

LIABILITIES

Preferred stock	$2,000,000	$2,000,000
†Common stock	24,134,500	24,134,500
Accounts payable	391,203	447,723
Wages payable	84,954	46,955
Federal tax reserve, etc.	386,667	404,475
Dividends payable	533,250	533,250
Insurance and other reserve	822,513	727,716
Earned surplus	5,071,778	5,173,468
Total	$33,424,865	$33,468,087

*After depreciation, depletion, etc.
†Represented by 711,000 no-par shares.

Recent Dividends Announced

Bessemer Limestone & Cement (qu.)	75c, Nov. 1
Missouri P. C. (qu.)	50c, Nov. 1
Missouri P. C. (extra)	50c, Nov. 1
Northwestern States P. C.	2%, Oct. 1
Pacific P. C. pfd. (qu.)	1.62½, Oct. 5
Penn. Glass Sand pfd. (qu.)	1.75, Oct. 1
Riverside Cement, Cl. A (qu.)	31¼c, Nov. 1
Riverside Cement pfd. (qu.)	1.50, Nov. 1
Wolverine P. C. (qu.)	15c, Nov. 15

Mississippi to Have Portland Cement Plant

A GREAT DEAL OF INTEREST was created in Vicksburg, Miss., recently by the announcement through the Vicksburg Chamber of Commerce that the National Portland Cement Co. will construct a plant in Vicksburg for the manufacture of portland cement which will call for an initial investment of about one million dollars.

The site of the cement plant will be on the National Cemetery road, near the terminus of North Washington street, beginning at the roadway which leads from the National Cemetery road eastward over Fort Hill, and thence 1,759 ft. northward, taking in the property on Fort Hill owned by the Maute, Keefe and Dornbursch estates.

The announcement by the Chamber of Commerce comes after several months of efforts to get the plant located here. The commerce body has been aided by Mayor Hossley, Senator John Culkin and Hugh Critz of the Mississippi Power and Light Co.

The charter of incorporation of the National Cement Co. gives the officers of the company as follows:

H. J. Harris, 4432 Edmondson street, Dallas, Texas, president; Joe Finger, Houston, Texas, vice-president; C. T. Atkinson, Dallas, Texas, secretary-treasurer; C. W. Boone, Tyler, Texas, chairman of the executive board. Four residents of Mississippi will be elected members of the executive board.

The negotiations which have resulted in having this big cement company locate a plant here have run over several months. A number of inspection trips here by experts of the company was first necessary, after attention of the officials had been called to the possibilities for manufacturing cement here. These trips were followed by meeting of the stockholders and directors of the company in Dallas and El Paso, Texas, before which W. N. Miner, secretary of the Vicksburg Chamber of Commerce, appeared. Mr. Miner ably presented the required information, such as raw material, transportation facilities, etc., which was set forth in a brief.

Options were secured as a result of the meetings on the required amount of land and Production Manager H. G. Martin from the new California plant of the company, and A. J. Kutner, sales manager, were sent here to make further investigation. Samples of the raw material were secured and a complete analysis made in the state laboratories at Starkville. It was definitely determined that the raw material was satisfactory.

Further options were secured through the efforts of Mayor Hossley, which resulted in the deal being carried through.

Through Chaney and Culkin, who have been retained by the National Portland Cement Co. as legal advisers, the company filed application for charter under the name of the National Portland Cement Co. of Mississippi, which has been granted, giving them the right to operate in this state.

Mr. Kutner yesterday in commenting stated: "My company is very well pleased with the progress that has been made so far and are very enthusiastic over the general situation from a cement manufacturing standpoint, and we are very appreciative of the help and cooperation we have received from everyone with whom we have come in contact, especially did we appreciate the assistance rendered by Secretary Miner of the Chamber of Commerce, Mayor Hossley of the City of Vicksburg, Mr. Critz of the Mississippi Power and Light Co., Senator J. H. Culkin and the railroad officials, each of whom made available for our use information and data that was of material assistance in arriving at definite decisions and in making necessary investigations. We have found all statements made to us relative to the possibilities at Vicksburg were based upon real facts."—*Vicksburg* (Miss.) *Herald.*

Organize New Gravel Company

ACCORDING to recent announcement the Belle Cheney Sand and Gravel Co. has been organized at Opelousas, La., with a capital of $30,000 by J. P. Barnett, capitalist, and Albert Tate, civil engineer, both of that city. The former was elected president of the new firm and the latter secretary-treasurer and general manager.

The Belle Cheney concern has taken over the extensive holdings of gravel formerly controlled by John W. Lewis, local attorney, and his associates. This plot, covering an area of approximately 1000 acres, is located in the vicinity of Belle Cheney Springs, 40 miles northwest of Opelousas.

Work on a two-mile spur track which will connect the gravel pits with the main line of the Missouri Pacific Railroad near Turkey Creek, has been started.—*New Orleans* (La.) *Times.*

George McEntyre

GEORGE J. M'ENTYRE, pioneer gypsum and lime plant operator and more recently a salesman for the Standard Gypsum Co., died recently as a result of heart trouble at Seattle, Wash.

Mr. McEntyre was born in New York City, learned the carpenter trade, managed lime and gypsum plants in the East, and then came to Washington 15 years ago to take the management of the Pacific Coast Gypsum Co.'s plant at Tacoma. Later he became interested in the Northwest Gypsum Products Co., and built a plaster and tile plant near Lewiston, Mont. Two years ago he joined the force of the Standard Gypsum Co. of Seattle, having charge of the company's sales in Eastern Washington. He was one of the best known men in the Northwest building material field.

Arkansas Portland Formally Opens New Plant

OVER 500 people were present at the recent formal opening of the new Arkansas Portland Cement Co. plant at Okay, near Nashville, Ark. A Missouri Pacific special train running from Little Rock, Ark., carried 150 customers, officials of the company and others to the plant site. Following an inspection of the new mill, the visitors were entertained by the Arkansas company at a luncheon at which Lieut. Gov. Cazort of Arkansas was the principal speaker.

Immediately following the luncheon the visitors witnessed a blast of 102 holes, charged with 20,200 lb. of explosive, which dislodged about 100,000 tons of limestone, sufficient for four months' normal operation. Orders from four states totalling 125 cars of cement were on the sidetracks and some of them moved out while the ceremonies were in progress.

The Arkansas mill, a subsidiary of the Ideal Cement Co., Denver, Colo., is one of the latest wet-process operations in the country, employing a single 300-ft. by 11-ft. 6-in. dia. kiln, and producing about 2200 bbl. of cement per day. A similar kiln, doubling capacity, will be installed early in 1930, according to D. M. Pinkston, sales manager for the company. Natural gas from Emmett, Ark., is used for fuel. The plant ships into three states in addition to Arkansas, viz., Mississippi, Tennessee and Louisiana. Railway connections are made with the Missouri Pacific at Nashville, Ark., and the Kansas City Southern and Frisco at Ashdown.

In addition to numerous highway and railroad officials and public utility officials, personnel of the Ideal Cement Co. at the opening included: Charles Boettcher, president; R. J. Morse, vice-president and general manager; Chauncey Nichols, vice-president; J. F. Kaufman, resident superintendent; O. A. Bayless, chemical engineer; Frank K. Hensley, resident chief chemist; H. C. Abrams, chief clerk and J. W. Camby, Little Rock; Louis Downs, Fort Smith; E. S. Girault, Monroe, La.; Edgar Nichols, Shreveport, La., and Ed Trigg, Texarkana, members of the sales department.—*Little Rock* (Ark.) *Gazette.*

New California Portland Cement Mill Nearing Completion

C. S. ATKINSON, secretary of the National Portland Cement Co., 523 Kress Bldg., Houston, Texas, informs us that his company's plant at Chubbuck, Calif., on the Santa Fe railway in San Bernardino county, is just being completed. This is the same company that is reported to be projecting a plant at Vicksburg, Miss., and is not to be confused with the National White Portland Cement Co., Houston, Texas, which has a small mill in Houston.

Utah and Idaho Mills Hold First Safety Meeting

Conference at Ogden on September 28

THE first regional safety meeting held under the auspices of the Portland Cement Association, for its member mills located in Utah and Idaho, took place at Hotel Bigelow, Ogden, on September 28. Although an entirely new feature of their safety work so far as the mills of this area are concerned, the response was considered excellent. Representatives of the Union, Utah-Idaho and Idaho Portland Cement companies were present, those from the Portland Cement Company of Utah being detained by the unexpected absence from the mill of general manager H. A. Snow and superintendent E. J. Gallacher.

O. C. Hart, general chairman

O. C. Hart, superintendent of the Utah-Idaho Cement Co. plant at Brigham City, acted as general chairman. R. R. Dorland, plant superintendent of the Union Portland Cement Co. at Devil's Slide, Utah, presided at the afternoon session and conducted the general discussion. H. C. Day, vice-president and general manager of the Utah-Idaho acted as luncheon chairman, and Ralph E. Bristol, secretary-treasurer of Utah-Idaho was toastmaster at the dinner. The program was as follows:

Morning Session

Opening Remarks by Chairman O. C. Hart.

Making Progress—A. J. R. Curtis.

How to Improve a Safety Record—L. E. Howard, chief clerk, Utah-Idaho Cement Co.

Avoiding Infections, Dermatitis and Conjunctivitis—C. E. Dorland, surgeon, Union Portland Cement Co.

The State's Efforts to Avoid Industrial Accidents—O. F. McShane, commissioner, Utah State Industrial Commission, Salt Lake City.

Luncheon

A Physician's Comments on Safety Work —L. D. Mahannah, surgeon, Utah-Idaho Cement Co.

Concrete as a Preventative for Accidents —F. H. Richardson, district engineer, Portland Cement Association, Salt Lake City.

Afternoon

Departmental Discussion of Accident Prevention, conducted by R. R. Dorland, superintendent, Union Portland Cement Co.

Mill Departments—J. H. Neill, vice-president, Idaho Portland Cement Co., and E. D. Brimley, general foreman, Union Portland Cement Co.

Burning and Coal Grinding Departments —M. E. Olson, mechanic, Utah-Idaho Cement Co., and R. R. Dorland.

Packing, Shipping and Cement Storage— Francis Bray, shipping clerk, Union Portland Cement Co.

Power, Shops and Electrical Departments —Charles Weed, machinist, and W. S. Chrysler, electrician, Utah-Idaho Cement Co.

Yard and Railroad Departments—W. L. Hill, safety agent, Union Pacific System, and A. Petersen, yard foreman, Utah-Idaho Cement Co.

First Aid Discussion and Demonstration —D. J. Parker, supervising engineer U. S. Bureau of Mines, Salt Lake City.

Dinner

Address by Gerald Yearsley, safety inspector, Utah State Industrial Commission.

Address by Ralph E. Bristol, secretary-treasurer, Utah-Idaho Cement Co.

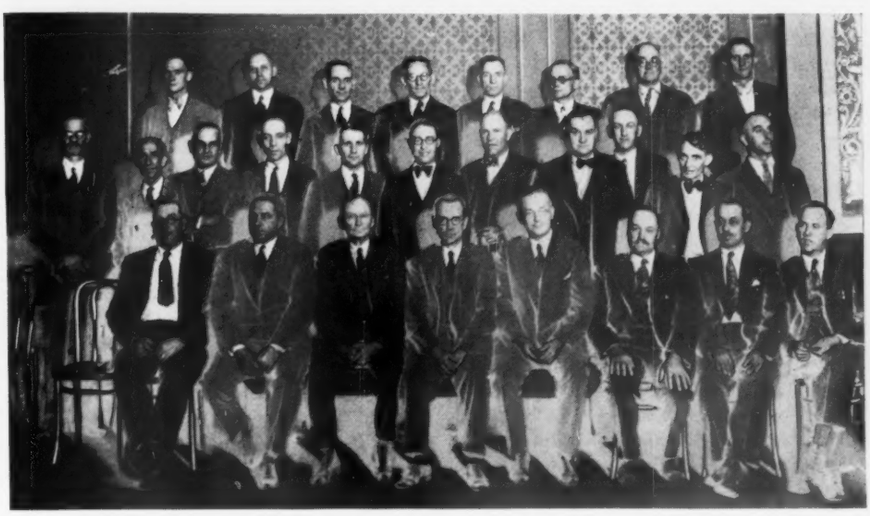
In calling the meeting to order, O. C. Hart stated the purposes of the occasion and read a felicitating telegram received from J. B. John, chairman of the committee on accident prevention and insurance of the Portland Cement Association.

A. J. R. Curtis of the Portland Cement Association followed with the customary brief outline of safety progress throughout the industry and was in turn followed by L. E. Howard, chief clerk of the Utah-Idaho Cement Co., who read the paper:

How to Improve a Safety Record

"The subject has always been a vital one with us, and our management has worked at all times with the different safety organizations of the state and government, as well as insurance carriers, and, as a consequence, our plant today is well equipped with mechanical safeguards. However, we have a long way to travel in the matter of safety, and the observations made here are for the purpose of improving present methods of handling our safety work.

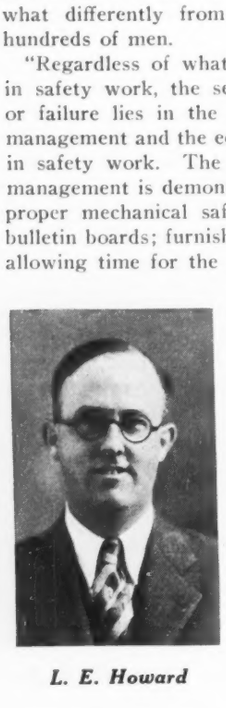
"Conditions in this territory cannot be compared to those existing in larger communities, and safety work handled in small plants, isolated from centers where other safety work, lectures, etc., are car-



Regional safety meeting, Portland Cement Association, at Ogden, Utah

ried on, must necessarily be handled somewhat differently from plants employing hundreds of men.

"Regardless of what methods are used in safety work, the secret of its success or failure lies in the cooperation of the management and the education of the men in safety work. The cooperation of the management is demonstrated in providing proper mechanical safeguards; supplying bulletin boards; furnishing meeting places; allowing time for the meetings; etc.



L. E. Howard

"Cleanliness of plant property is essential. Dirt must be cleaned up, scrap disposed of, passageways marked and kept free of obstructions; buildings maintained in repair; grounds kept orderly and neat.

"Good lighting is necessary both day and night; windows and openings must be kept clean to allow all the light possible to enter; for night lighting, plenty of electric lights should be in and about the mill and yard so the hazards of darkness cannot exist. Numerous places for plugging in extension lines should be accessible for proper lighting.

"The furnishing of lockers, drinking fountains, showers and toilet facilities also have considerable bearing on the question of safety and improved morale.

"All these things I have mentioned are physical necessities. They should be maintained to the highest point of efficiency. But there is still an important phase, that of educating employes in safe methods of working, getting their cooperation to apply these safe methods at all times so they do not get hurt or hurt someone else.

Accidents from Carelessness

"It is commonly known that most accidents are preventable; that they are due mostly to carelessness, thoughtlessness or unlawful practices on the part of workmen and not to defective machines. It should not, however, be taken for granted that every man knows the safe and unsafe ways of doing his work, neither should we assume that without special instructions men will take the safe course of their own accord. Many accidents are undoubtedly caused by sheer carelessness, yet how often would what appears to be carelessness, turn out to be simply ignorance due to lack of instruction.

"The bulletin board is an important item in the education of the workman. Regular meetings for discussion form an important part of the educational program. These should be held at least once a month, and special meetings called whenever anything arises of sufficient importance to justify. I believe best results are obtained in these meetings by having the heads of the different departments act as chairmen, and at each monthly meeting have a different chairman. In this manner a spirit of rivalry will be promoted as to who will put over the best program and make the subject of safety most interesting to the men. Possibly a prize for the best program during the year might be advisable, making the award on the vote of the men.

"A good time for the promotion of safety work is after a shut down period. The men should be called together a day or two before the plant is started for a general meeting. Several outside speakers, if obtainable, will, I believe, get better results than if the local foremen do all the talking.

Eye Protection Appeals

"Of all the phases of safety work there is none, we believe, which has a greater appeal than eye protection. We have furnished our men with goggles and have insisted that they wear them when performing work where there is a possible chance of eye injury, and in looking over our eye injury records I find that we have practically eliminated this type of accident. Goggles are purchased by the company and furnished without cost to the men.

"Another point to be stressed is the prompt reporting of all minor scratches, bruises, etc., to the first aid dispensary so that they may be attended to at the time. It has been my experience that men dislike reporting accidents, and I have known of instances where they have concealed injuries, which later developed into serious affairs on account of this dislike. Education is the only remedy for this state of mind on the part of the employe and it should be the aim of the safety committees to educate all new men on the importance of immediate injury reports.

"Though I may be infringing in the doctor's field, I would like to stress the importance of personal cleanliness, frequent bathing and the use of warm clothing. I have noted that the employe who is clean, and who takes care of his personal appearance, is usually the best workman, the best fellow to work with, and the one who has the least number of accidents.

The Mental Attitude

"We often overlook the mental attitude of the employe. On the surface he may appear sullen, opposed to everything suggested, indifferent and seemingly ready for any kind of an accident. It has been our experience that a friendly talk with such an employe usually shows that he has trouble at home. It may be financial or home life, or that he is ill or suffering from some minor affliction, or one of a dozen of things. If he is permitted to unburden and is shown that the organization is actually interested in him and willing to offer help, he usually turns out to be a very good employe. If the man, however, is naturally sullen and indifferent, the best course is to let him out.

"Putting safety across in the cement plant cannot be done spasmodically; it requires the effort of everyone in the organization to be everlastingly at it."

Medical Discussion Helpful

Following Mr. Howard's paper, Dr. C. E. Dorland presented an interesting discussion on dermatitis, conjunctivitis, and infections. Dr. Dorland explained the industrial types of dermatitis, including such eruptions as boils and eczema and stressed strongly the fact that hygienic measures—frequent baths and changes of underwear—were most efficient in preventing skin irritations due to contact with the dust. Conjunctivitis is inflammation of the lining of the eye, occurs occasionally among packers, being caused commonly by receiving a "shot" or spurt of cement in the eye while filling sacks. Such occurrences are usually due to careless inspection which permits sacks containing small holes to pass to the packing department for refilling.

Dr. Dorland stressed the danger of rubbing the eyes with the hand or allowing persons without training to attempt to remove foreign matter. Prompt use of a prescribed antiseptic wash, preferably administered under the supervision of the surgeon, was advocated. Infections were described and emphasis placed on care in selection and use of antiseptics, methods of stopping flow of blood and getting injured into the hands of the surgeon as speedily as possible.

Utah Commissioner Speaks

The next speaker was Hon. O. F. McShane, commissioner of the Utah State Industrial Commission. His subject was: "Problems Confronting the Industrial Commission." Mr. McShane's admirable paper is reproduced in part elsewhere in this issue.

Following Mr. McShane's address the meeting adjourned to luncheon. Harold C. Day, vice-president and general manager of the Utah-Idaho Cement Co. acted as chairman and at the conclusion of the meal introduced Dr. L. D. Mahannah, of Brigham City, who spoke on the importance of properly handled first aid work and F. H. Richardson, district engineer of the Portland Cement Association at Salt Lake City, who described the work of the Association. Dr. Mahannah counseled his audience to get injured men under the care of the physician promptly and without causing further injury. He felt that by regarding even the lighter injuries seriously, and taking steps accordingly, many really serious conditions would be avoided. Mr. Richardson gave those present, consisting of operating men, a clear and interesting picture of the work

being done by the Portland Cement Association to develop markets for the products of their mills.

Afternoon Session

R. R. Dorland, of the Union Portland Cement Co., opened the afternoon session with the following remarks:

"Quarrying rock for cement manufacture or other uses involves many hazards to be guarded against and a quarry always presents many safety problems. There are also many problems connected with operating a mill safely, particularly a relatively old mill. Some of the hazards of the older mill have been eliminated in the design of modern plants and machinery, but we, in Utah, have the older mill conditions to face. We all know that there are few greater hazards than those connected with the operation of a coal grinding plant.

F. H. Richardson

"I believe we are all coming to feel that the first consideration in safety work should be for the welfare of the worker. Of course the employer does and should benefit when accidents are avoided. Even the outside community is benefited. The results of an accident may be compared to the effect of dropping a pebble in a pool. The effect is greatest at the point of contact, but all of the pool is agitated and disturbed.

"We are now to have our round table discussion. This is your session. We are here to get ideas by exchanging them with each other. I hope you will discuss freely these quarry and mill hazards, the methods you are using in your safety work and any other subject which might be helpful in banishing injury to our workmen."

Parker Talks on First Aid

D. J. Parker, supervising engineer of the U. S. Bureau of Mines for the Utah and Nevada mining regions, and a distinguished member of the staff of the University of Utah, discussed the scope of first aid training; the methods pursued in the Bureau of Mines training courses, and the benefits to be derived. Mr. Parker then gave a very comprehensive demonstration of the work, using as subject Mr. R. B. Robinson of the Union Portland Cement Co. At the conclusion, the mills represented announced tentative plans to train their men under Mr. Parker's direction. While assigned in California recently Mr. Parker trained several of the prize-winning cement mill teams there.

D. J. Parker

Dinner was an extremely enjoyable affair. Chapin A. Day, president of the Utah-Idaho Cement Co. arrived in the city just in time to join the party. Ralph E. Bristol, secretary-treasurer of the Utah-Idaho Cement Co., acted as toastmaster. Gerald Yearsley, safety inspector of the State Industrial Commission read an interesting paper based on data drawn from his experience in the safety work of the state. Mr. Bristol closed the meeting with a humorous reading.

Registration

REGISTRATION AT THE REGIONAL SAFETY MEETING AT OGDEN, UTAH.

Idaho Portland Cement Co., Inkom, Idaho.
J. B. Maxfield, vice-president.
J. H. Neill, vice-president.

Union Portland Cement Co., Devil's Lake, Utah.
R. R. Dorland, superintendent.
L. S. Ball, shift foreman.
W. F. Blackinton, shop foreman.
F. E. Bray, shipping clerk.
E. D. Brimley, general foreman.
C. E. Dorland, surgeon.
R. J. Hansen, electrician.
John Hopkins, quarry foreman.
A. E. Lucas, chief chemist.
C. W. Nielson, shift foreman.
Roscoe B. Robison, carpenter.
E. G. Toone, repairman.
V. T. Williams, chief clerk.

Utah-Idaho Cement Co., Brigham City, Utah.
Chapin A. Day, president (Ogden).
Harold C. Day, vice-president and general manager (Ogden).
Ralph E. Bristol, secretary and treasurer (Ogden).
O. C. Hart, superintendent.
Walter S. Chrysler, electrician.
W. G. Doe.
L. E. Howard, chief clerk.
F. C. King, burner.
L. D. Mahannah, surgeon.
M. E. Oken, mechanic.
Andrew Peterson, yard foreman.

R. R. Dorland

Chris Rasmussen, locomotive engineer.
C. J. Smith, chemist.
Charles Weed, machinist.

MISCELLANEOUS GUESTS

A. J. R. Curtis, assistant to general manager, Portland Cement Association, Chicago; W. L. Hill, safety agent, Union Pacific System, Ogden, Utah; T. A. Heringer, factory inspector, Utah State Industrial Commission, Salt Lake City; O. F. McShane, commissioner, Utah State Industrial Commission, Salt Lake City; D. J. Parker, supervising engineer, U. S. Bureau of Mines, Salt Lake City; F. H. Richardson, district engineer, Portland Cement Association, Salt Lake City; Gerald Yearsley, factory inspector, Utah State Industrial Commission, Salt Lake City.

Problems Confronting the Industrial Commission*

By Hon. O. F. McShane
Commissioner, Utah State Industrial Commission, Salt Lake City

Of the hundreds of problems presented to the commission for solution I shall mention but three, chosen for the reason that they are all present in the conditions out of which industrial accidents arise.

These problems briefly stated are:

(1) To make and enter a proper award when the right to compensation has been established.

(2) To re-educate and return to remunerative employment those who suffer a physical handicap due to industrial injury.

(3) To prevent accidents.

Taking these up in the order in which they are stated, the following matters pertaining to their solution should ever be kept in view:

(1) It should be seen that injured workmen are adequately compensated during their period of disability. This does not only include a monetary remuneration for time lost but the furnishing of the best hospital, nurse, medical and surgical service which money can buy.

No law should provide so high a compensation benefit as to encourage men to malinger. There ought always to be a very strong inducement for men to return to work and that inducement should be his full wage. Neither should a law provide such a high rate of benefits as to cause employers to consider the revision of wage scales downward in order to escape what may be termed unreasonable compensation costs.

(2) A proper agency, secure in tenure should be provided for the rehabilitation and return to industry of injured workmen who sustain a permanent partial loss of bodily function. This should be done not as a matter of sympathy but because of its economic value to society.

In commenting upon the security point,

* Read at Regional Safety Meeting of Portland Cement Association held at Ogden, Utah, on September 28, 1929.

no administrative body such as the industrial commission can function as efficiently and economically if subject to political control as when such interference is not had. Until such time as business men stand four-square for the application of business principles in administrative matters, public service will be sub-standard and the cost will be exorbitant.

It is true that not all can be rehabilitated—some because of the nature of their injuries, some because of their mental limitations, and some because of age; these, however, are questions for a skilled director to determine.

(3) The third and last problem, but the most important of all, is that of preventing industrial mishap to workmen, the elimination of accident hazards and the education of workmen in avoiding accidents after they have been carefully selected and properly placed at their respective duties.

O. F. McShane

It seems to me there is no objection to the practice of making a thorough physical examination of applicants for employment before they are hired and put to work, provided the purpose of the examination is not to discard those who are sub-standard psysically, but is for the purpose of intelligent placement after employment.

As this is a safety meeting, it is upon this last proposition that I wish to dwell. Webster defines safety as

> "Freedom from whatever exposes one to danger or from liability to cause danger or harm."

A real piece of constructive work has been done when an accident has been prevented and a life saved. In comparison, an order for the payment of compensation is but a sickly gesture in way of service. In order to accomplish a reduction in accident frequency there must be unity of action; safety begins at the top.

The "Safety" Worker

Few accidents today are traceable directly to lack of safety appliances or to their faulty construction. The greatest safety factor in any plant, shop or mill is a careful workman. The hope of the future as regards a reduction in accident frequency is in the education of the workers themselves. That is the field in which the greatest activity on the part of the employer and bodies administering safety laws should direct their energies.

Your foreman is a most important individual from a standpoint of safety. He has the selection and placing of workmen; no more important functions are performed than these. He must be a close student of psychology. He must be able to analyze human nature to a point where he can properly select men. There are few men who cannot economically be used in some place in some employment. By wise and judicious selection and placement, labor shortages may be obviated before they occur, and turn-over reduced to a minimum.

Henry Ford finds it economic to employ in some of his plants one man in every three with some serious physical disability. This is more than his share, yet he makes it pay. If he can do this much, other industrialists can certainly do less.

No matter how intelligent the management, no matter how intelligently the employes are chosen, no matter how skillfully they are placed, no matter how favorable the working conditions may be, no matter how favorable conditions may be as to temperature, light and ventilation, no matter how splendidly the physical conditions of the plant may be kept up—accidents will occur because of the employe's own willful disregard of instructions and the safety of his person.

In addition to the spirit of downright cussedness on the part of some employes, there are several mental factors in the individual, which, if not recognized and counteracted, will be responsible for a great many otherwise preventable accidents.

These mental factors have been classified by one student of the subject as:

Mental Factors of Safety

(a) *IGNORANCE.* Particularly is this the case among foreigners. Among such a class it is difficult to give explicit instructions regarding their employment and the hazards to accidents which are present.

(b) *INEXPERIENCE.* Such workmen are far more liable to accidents than the "old timers." Unfamiliar surroundings, anxiety and hasty instructions contribute to the accidents which befall this class.

(c) *MENTAL LIMITATIONS.* There are several levels of intelligence. Some men need only one warning while others seem mentally incapable of correcting the accident habit.

(d) *FAULTY ATTITUDE.* It is sometimes hard to secure co-operation in the acceptance and use of safety appliances; men are inclined to take chances. Particularly is this true if they consider themselves very skillful. Fatalism is also a serious factor in sustaining indifference and skepticism toward safety appliances.

(e) *EXCITABILITY.* The highly excitable man is a menace to himself and others. With proper handling the excitable person becomes alert, and in a quiet, orderly workshop becomes as safe as the average person. Where there is confusion and tense accident hazard, the excitable person is a misfit.

(f) *INATTENTION AND LACK OF INTEREST IN ONE'S EMPLOYMENT.* Boredom and distraction are the two leading mental states which lead to a distracted mind. The workmen may be bored for three reasons:

(1) The pay may not be enough to meet his necessary expense;

(2) His particular performance may seem to him trivial and unimportant;

(3) The job may be injuring his health.

The foregoing conditions occasion loss of interest and result in indifference and distraction. A general atmosphere of confusion and periods of hurry and stress keep a workman distracted when his attention should be on his work. Such conditions are usually due to bad scheduling.

You must, in your organized effort (and you must have organized effort if you hope to get anywhere) to reduce accident frequency, be careful that competition between your various units in the same plant or between your different plants does not become so keen as to result in a failure to report accidents. The temptation to not make reports of accidents, or to minimize the seriousness of those reported, will be the logical result of an over stimulation of an accident prevention campaign. When this condition prevails your safety program has gone to seed. Disabilities slumbering, without proper medical care, are sure to appear in the future more serious in nature, more difficult to treat, more expensive and with less certainty as to cure. False statistics are reported upon which unscientific premium rates are predicated. Prolonged suffering, loss of members, and even death results from failure to promptly report every case.

In conclusion permit me to say that the "ballyhoo" of the shop safety meeting is valuable, inspiring and efficient only when sustained by a regular program of safety and supported by careful inspection and competent safety engineering practices.

The formation of regular safety organizations by the management without real interest other than the securing of credit on schedule rating is a hollow mockery and is discredited by the deplorable accident toll due to lack of managerial contact and necessary support of a well planned constructive safety program.

Mineral Resources of Tennessee

THE TENNESSEE Division of Mines, in its latest annual report of the mineral resources of Tennessee, gives various data, statistics on the status of the various mineral industries within the state, based on information furnished by producing companies. Of interest to rock products operators are the sections dealing with production of nonmetallics; these contain much data on amounts produced, employes' wages, vital labor statistics, location of plants and deposits, production costs, etc.

Wolverine Mill Unveils Safety Trophy

Plant at Quincy, Michigan, Holds Ceremony on October 10

CEREMONIES attending the unveiling of the Portland Cement Association safety trophy for 1928 at the Quincy, Mich., plant of the Wolverine Portland Cement Co. took place on October 10. The occasion was an extraordinary one in several particulars. Not only did it include the usual perfunctory words of presentation and acceptance of the trophy and a jollification because of the general freedom from injury which its workmen have enjoyed, but officials of the company took occasion to announce the continuance of operation and the reconstruction of the mill. Work will start soon on the installation of a new 300-ft. kiln to replace several of the smaller kilns now in service.

The definite announcement that the mill

W. F. Murray

would not only continue but is to be completely modernized came as good news to the town, as the cement mill not only puts Quincy "on the map" but "on the pay roll" as one of the speakers said, and consideration had been given recently to dismantling the plant because of the apparent exhaustion of the local marl supply. Dredging operations recently undertaken by the company have made available plenty of marl for several years and the general economy of the Quincy operations not only made it possible to continue but has led to the decision to modernize the mill.

Unfortunately, a rainstorm started an hour before the ceremonies were scheduled to begin, making it impossible to hold the program in the plant park where the trophy had been erected. A speaker's stand had been prepared and covered most attractively with fall leaves. A large refreshment stand similarly decorated was located at the rear of the park area. However, the rain made it necessary to move into an empty mill building nearby, where there was plenty of room and convenient space for seats. A motor truck served acceptably for a platform. The crowd which came out, notwithstanding the weather, was obviously in a mood to make the best of the situation and remained in good humor throughout. President C. C. Jones and Secretary-Treasurer P. H. Sweeney were on hand early to congratulate the mill force, and remained throughout, both modestly refraining from appearing on the program.

General Superintendent W. F. Murray called the meeting to order and turned it over to Chief Chemist L. A. Hutchins, who acted as chairman. Mr. Hutchins spoke briefly on the functions of the Portland Cement Association, then introduced A. J. R. Curtis of Chicago, assistant to general manager of the Portland Cement Association, who turned over the trophy to the mill organization on behalf of the cement industry of America.

In accepting the trophy, John Dieterman, superintendent of the Quincy plant, paid fitting tribute to the loyalty of his men and to the help given by the company management. In closing he assured the Portland Cement Association that the Quincy organization would continue to put forth its best efforts and could be depended upon to win many re-inscriptions on its trophy during future years.

C. C. Jones, president, Wolverine Cement Co.

The address of the day was made by Hon. W. G. Cowell, a director of the Wolverine Portland Cement Co., who was raised in the vicinity and has watched the progress of the company and the Quincy mill with greatest interest. Mr. Cowell viewed as remarkable and praiseworthy the perfect accident record of this mill in view of the fact that its present equipment is of the older type, much of it installed thirty years ago. Good records by mills which have the advantage of recent installations were not looked upon as so much of an achievement. Mr. Cowell discussed briefly the improvements to be made at Quincy and heralded them as a guarantee of continued fine safety records.

A first aid demonstration by the plant

Safety committee, Quincy plant, Wolverine Portland Cement Co.

The Quincy, Mich., plant, Wolverine Portland Cement Co., one of the safety trophy winners for 1928

first aid team was a very interesting and enjoyable feature. This team, having no opportunity to apply its skill in an accidentless plant, plans to demonstrate and teach others in the community and to hold itself subject to call at all times. After the demonstration a commotion suddenly attracted the attention of the assemblage, being caused by the rapid entrance of a mock first aid team of three men, the last of whom was conveying a dummy victim in a wheelbarrow. The victim, on being dumped from the barrow on to the canvas mat, turned out to be none other than Old Man Accident himself. In opening his shirt, which consisted of a bag, a large black cat was released. A bicycle pump was brought and the victim inflated with hot air, tossed in an improvised ambulance and removed from the plant, amidst the plaudits of the crowd.

The Channel City band played acceptably during the ceremonies. At the close refreshments were served and many of the crowd braved the rain to gather around the trophy for personal inspection.

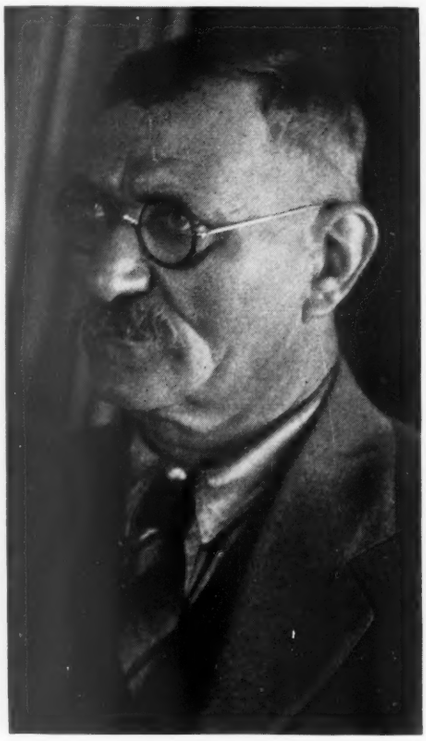
Safety Work in the Stone Industry of Ohio

ACTIVITY in safety work, especially along the lines of accident prevention organization in the northwestern part of the state, has been very pronounced during the first half of the year, numerous safety rallies having been held under the direction of the division of safety and hygiene of the Industrial Commission of Ohio.

George P. Meehan, safety engineer for the division in the Toledo area, assisted by H. M. Schnerer of the Cleveland area, have been conducting a series of meetings for quarry workers. Largely attended and enthusiastic gatherings were held at Kelley's Island, Marblehead, Whiterock and Gibsonburg. Additional meetings at other points in the district are being arranged, indicating an intensive effort on the part of the division of safety and hygiene to interest employers and workers in the improvement of the accident experience of the quarries and stone crushing industry.

In order to present to the management and workers of the quarries and stone-crushing industry a comprehensive view of their accident experience, Supt. Thos. P. Kearns of the division had his statisticians make a special study of the situation. This developed the information that the 1927 figures show a considerable improvement over those for 1926 as regards severity of accidents, but the frequency rate was slightly higher. In 1928, the frequency rate showed a small reduction but the severity rate increased.

In 1926 there were 2,049 accidents charged to quarries and stone-crushing, of which 24 were fatalities, 19 permanent disabilities, 816 causing over seven days' lost time, 365 seven days or less and 825 no loss of time but requiring medical attention. The total time loss chargeable to these accidents was 193,457 days.



John Dieterman

In 1927, there were 2,145 accidents but the fatalities were reduced to 20, with permanent disability cases increasing to 24. Of the total cases, 820 caused over seven days' lost time, 433 seven days or less and 848 no loss of time. The total time loss dropped to 160,524 days.

In 1928 there were 1,923 accidents, including 21 fatalities and 20 permanent disabilities, while 685 cases caused over seven days' lost time, 379 seven days or less and 818 no loss of time. The total time loss chargeable to accidents in this year was 186,650 days, a sharp increase over the preceding year.

The fluctuations in the accident experience of the industry is reflected in the average manual rates for the classification for the three years used for purposes of comparison. In 1926 the rate was $3.55, in 1927 it was $3.91 and in 1928 it receded to $3.74.

A study of the 1927 and 1928 experience of the classifications as to causes of accidents shows but slight variation in the two years, hence the figures for 1928 will suffice to show the sources of accidents. Machinery caused 140 accidents, boilers 3, pumps and compressors 12, transmission apparatus 10, elevators 2, cranes and derricks 77, cars and engines 259 with 6 fatalities; motor vehicles 67 with one fatality; house vehicles 12 with one fatality; hand trucks 4; water craft 1; handling objects 231; hand tools 272; electricity 20 with one fatality; explosions and explosives 22 with one fatality; hot, corrosive and poisonous substances 71 with one fatality; falling objects 168 with 3 fatalities; falling objects (mines and quarries) 114 with 2 fatalities; falls of persons 143 with 2 fatalities; stepping upon or striking against objects 90; occupational disease 1 and miscellaneous 204 with 3 fatalities.

The accident records of the industry and the manual rate of the classification are such as to warrant the special interest shown by the division of safety and hygiene in stimulating interest in safety work. Recognition of the fact that there is room for great improvement in accident prevention is a logical reason for the increased interest in organized educational safety work on the part of employers and workers.

News From New Jersey Silica District

By Claude N. Terry
Millville, N. J.

THE MILLVILLE DISTRICT of New Jersey has had a very busy year so far and a large tonnage of silicia sand has moved out to steel mills and iron foundries. Prices have been good. Blasting sand prices have advanced about 50c per ton, and most of the plants have had a rush year. Quite some sand has moved out for slate sawing and polishing. The National Pulverizing Co. and Menantico Sand and Gravel Co. did most of this business.

The Maurice river, which runs through Millville, has been a busy scene this summer, the Diamond P Co.'s barges and tugs passing up or down most every day. The pits along the river of Whitehead Brothers Co. of New York, George Pettinos of Philadelphia, and Taggart and Paxton of Philadelphia have been regular bee-hives. A great deal of this sand has gone down East, even as far as Nova Scotia.

The Whitehead Brothers Co. of New York, which bought out the Charles Pettinos (of New York) sand pits here, has had a very successful year, their whirling molding sand machine at the Dorchester plant producing sand that more than met with the foundries' approval. This company is making several mixtures for different uses. The pits have been troubled with quite some water from over the winter.

The George Pettinos organization of Philadelphia, with plants here at Silver Run, Cedarville and Manumuskin, have completed a new plant to pulverize high bonding clay used to rebond burned-out foundry sands. This company is using a pulverizer of their own design, described in an earlier issue of Rock Products. It is also using this pulverizer on molding sand at Manumuskin.

The South Jersey Sand Co., with a plant on the Central Railroad of New Jersey, below Newport Station, has had one of its best years, mainly on silica sand, which it supplies to the Pennsylvania Pulverizing Co., a subsidiary of Pennsylvania Glass Sand Co. of Lewistown, Penn., which has a plant here. This company has installed new vibrating screens to grade the sand and is installing concentrating tables to remove the iron from the sand.

Eureka Company Building New Plant

The Eureka Flint and Spar Co. of Trenton., N. J., is erecting a silica pulverizing plant at the Tavern Rock and Sand Co. plant out Cumberland way. The Tavern Rock and Sand Co. is a subsidiary of the Illinois Glass Co. This concern has a very high grade silica and a flotation method combined with concentrating tables for removing iron and foreign matter.

Walter Willoughby is building a new type of pulverizing plant at the National Pulverizing Co.'s operation. It has a pneumatic pulverizer and was patented several years ago by his uncle, Alfred Willoughby, late of Philadelphia. This pulverizer uses opposing jets of super-heated steam to blast two streams of sand together. The striking of the sand grains against each other does the pulverizing. The fines are removed by suction created by a steam jet through a Venturi. It is said to be backed by some capital from Camden, N. J. The test run pulverized a very fine product of good color, 95% through 300-mesh, all passing 270-mesh. This is a finer product than the old pebble mills could make.

Experimenting with Low-Cost Pulverizing

They are looking for great things on low-cost pulverizing, with very fine products and no grit, as is the fault now; also looking for a wonderful future in other lines. The Lehigh Coal and Navigation Co., of Philadelphia ran tests on anthracite coal. Mr. Willoughby reported very successful results and low costs. He also reported working on gypsum and calcining it at the same time. Copper ores were also pulverized, and many other minerals.

A new silica has been reported to have been found in the Millville section. It is found only in a certain area. This silica has a certain quality that makes it a substitute for imported kaolin for certain purposes. New York and Eastern capitalists have been talking about forming a company with a million dollars in capital to develop this new silica. They saw a great future, but something happened that they didn't get control of the properties wanted.

Quite a rush occurred here about a month ago when a property known as Jones' Mill was prospected and found to have all the sands of South Jersey. The silica occurred in combination with pebbles and blast sand—something not usual here. This combination deposit was very desirable and several were after it. Adjoining it were molding sands, gravels and clays. William Veale of Dividing Creek, N. J., bought it and is holding it for development.

Limestone Quarries Co. Delphos Properties Reported Sold

PLANT and quarry lands owned by the Limestone Quarries Co. of Delphos, Ohio, and operated by the American Stone Corp., are reported to have been sold at a price between $200,000 and $250,000. The purchaser was not named, but it is assumed that the France Stone Co. or the National Lime and Stone Co. was the buyer. An agent of the purchasing company is said to have taken option on a 37½ acre tract adjoining the quarry with a view to future expansion. The transfer of properties will be made at the end of the year.

The local paper, the *Delphos Herald*, states also the American Stone Corp., will immediately open another quarry in northern Ohio.

According to W. R. France, owner of the Limestone company, one of three major stone companies operating in the territory was the purchaser. The third company, Erie Stone Co., is a subsidiary of the France Stone Co.

The present operation produces about 100,000 tons of crushed stone per year. It is an outgrowth of the old Fisher quarries, operated by Mr. France for a number of years.

There is a chance, it is stated, that an Amiesite plant might be added at the local quarry by the new owners for the manufacture of a prepared road material.

Graham Bros., Inc., Expand

GRAHAM BROS., INC., Long Beach, Calif., are now operating the Orange County plant located on Santiago Creek, about 7 miles from Santa Ana, Calif. The material is rhyolite gravel. The plant has a capacity of about 500 tons per day for one shift.

Graham Bros., Inc., have also acquired the Livingston Rock and Gravel Co. property near El Monte, Calif. This plant was described in Rock Products, September 1, 1928. The material is a granitic gravel and the plant has a capacity of 800 to 900 tons per day.

Eastern Rock Products, Inc., Expands

THE Eastern Rock Products, Inc., has taken over the F. E. Conley Stone Co. plant at Munns, N. Y., and proposes making extensive alterations both in the crushed stone and agstone departments before 1930.

American Granite Buys Georgia Tract

SALE of the Folson tract, Elberton, Ga., located near the quarries of the Elberton Granite Industries, is announced in the *Elberton* (Ga.) *Star*. The purchase of this property was made by the American Granite Corp. of Georgia, recently incorporated by Harry C. Morris of Cleveland, William H. Evers, Sr., of Cleveland, and Ben H. Atwell of New York and Chicago.

The American company has also contracted to buy an industrial site situated between the Seaboard and Southern railroad right-of-way.

Portland Cement Output in September

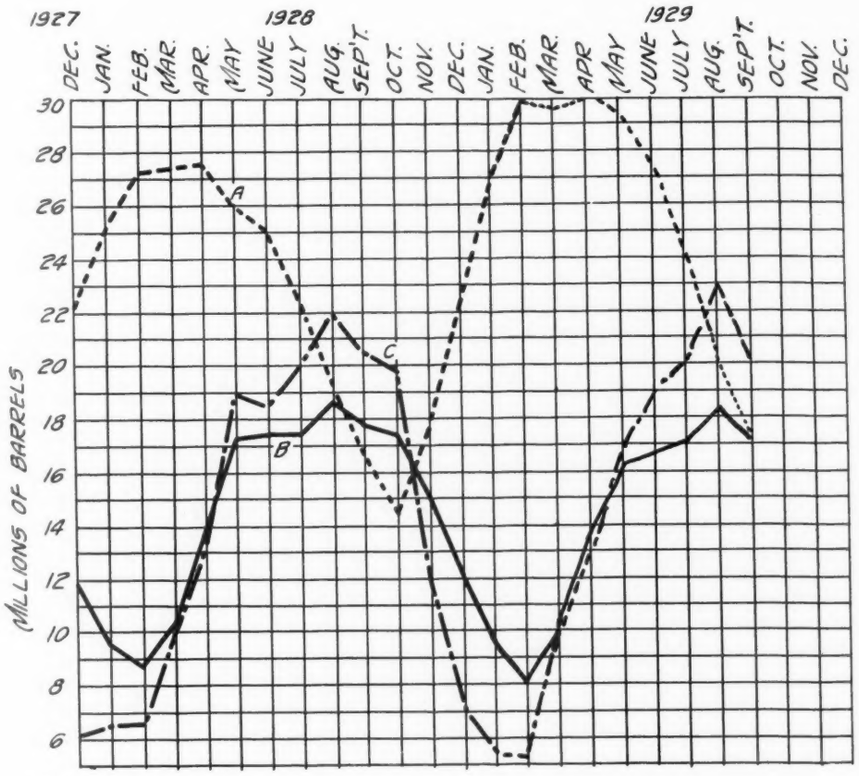
Production and Shipments Decrease—Stocks Higher

THE portland cement industry in September, 1929, produced 17,223,000 bbl., shipped 19,950,000 bbl. from the mills and had in stock at the end of the month 17,329,000 bbl., according to the United States Bureau of Mines, Department of Commerce. The production of portland cement in September, 1929, showed a decrease of 3.7% and shipments a decrease of 2.5% as compared with September, 1928. Portland cement stocks at the mills were 3.2% higher than a year ago. The total production for the nine months ending September 30, 1929, amounts to 128,165,000 bbl., compared with 131,178,000 bbl. in the same period of 1928, and the total shipments for the nine months ending September 30, 1929, amount to 133,545,000 bbl., compared with 136,284,000 bbl. in the same period of 1928.

The output of two more new plants, located respectively in Arkansas and western Pennsylvania, is included in the statistics here presented which are compiled from reports for September from all manufacturing plants except two, for which estimates have been included in lieu of actual returns.

Production-Capacity Relation

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 166 plants at the close of September, 1929, and of 159 plants at the close of September, 1928. In addition to the capacity of the new plants which began operating during the 12 months ended September 30, 1929, the estimates include increased capacity due to extensions and improvements at old plants during the period.


1927
1928
1929
DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP'T. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP'T. OCT. NOV. DEC.
30 28 26 24 22 20 18 16 14 12 10 8 6
(MILLIONS OF BARRELS)
A
B
C

(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

RELATION OF PRODUCTION TO CAPACITY

	September 1928	September 1929	Aug. 1929	July 1929	June 1929
	Pct.	Pct.	Pct.	Pct.	Pct.
The month	91.7	81.8	86.1	80.4	80.9
12 months ended	73.7	67.5	68.2	68.9	69.0

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during July and August, 1928 and 1929.

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN JULY AND AUGUST, 1928 AND 1929, IN BARRELS*

Shipped to	1928—July	1929—July	1928—August	1929—August
Alabama	267,843	227,381	315,341	271,466
Alaska	1,496	2,307	382	2,105
Arizona	42,336	46,241	57,033	57,184
Arkansas	123,490	181,615	150,173	187,688
California	1,081,470	905,437	1,166,958	1,007,181
Colorado	113,414	107,528	147,267	105,397
Connecticut	266,888	213,551	279,631	241,126
Delaware	35,077	43,016	29,447	56,135
District of Columbia	87,606	118,426	83,553	125,732
Florida	97,376	99,338	105,108	100,975
Georgia	135,770	157,113	181,254	160,279
Hawaii	21,832	21,348	25,413	26,037
Idaho	40,823	33,383	45,284	26,051
Illinois	2,321,485	1,835,790	2,581,921	**1,969,576**
Indiana	712,107	745,533	804,868	990,059
Iowa	873,528	809,784	813,328	1,108,711
Kansas	215,125	225,611	233,127	338,052
Kentucky	192,746	187,060	216,674	205,597
Louisiana	113,049	117,311	125,319	172,697
Maine	63,915	73,594	71,721	79,258
Maryland	246,605	305,219	260,189	323,021
Massachusetts	334,822	335,635	308,837	365,297
Michigan	1,540,219	1,677,282	1,707,324	1,891,753
Minnesota	435,564	478,941	401,260	533,434
Mississippi	90,937	109,161	122,486	131,963
Missouri	484,207	725,967	541,927	896,327
Montana	58,225	67,366	66,954	89,417
Nebraska	110,938	150,214	127,833	270,919
Nevada	10,535	10,841	14,101	12,186
New Hampshire	46,025	98,708	69,903	116,275
New Jersey	861,340	877,662	878,977	958,357
New Mexico	36,795	25,281	43,079	29,932
New York	2,480,799	†2,596,425	2,774,981	2,768,232
North Carolina	221,912	171,148	218,950	149,085
North Dakota	72,490	69,425	61,931	47,870
Ohio	1,313,568	†1,236,231	1,549,784	1,364,665
Oklahoma	285,643	323,528	286,023	371.205
Oregon	140,619	101,161	**175,733**	**124,852**
Pennsylvania	1,437,571	†1,565,726	1,699,137	1,710,648
Porto Rico	.....	7,702	.....	6,995
Rhode Island	68,980	73,134	71,291	101,278
South Carolina	149,917	140,609	152,387	89,733
South Dakota	61,429	61,786	62,440	55,114
Tennessee	288,860	452,694	323,794	481,869
Texas	601,154	741,455	690,901	877,463
Utah	58,462	43,737	65,376	57,547
Vermont	64,211	145,097	103,293	181,612
Virginia	183,762	194,236	214,602	205,771
Washington	361,159	263,893	408,566	310,711
West Virginia	151,406	†194,649	166,289	209,590
Wisconsin	812,237	823,678	809,545	952,914
Wyoming	21,154	21,230	30,976	26,480
Unspecified	2,209	.....	30,779	49,633
	19,841,130	†20,241,188	21,873,450	22,993,454
Foreign countries	59,870	53,812	96,550	58,546
Total shipped from cements plants	19,901,000	20,295,000	21,970,000	†23,052,000

*Includes estimated distribution of shipments from three plants in July and August, 1928, and in July, 1929; from four plants in August, 1929.
†Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN SEPTEMBER, 1928 AND 1929, AND STOCKS IN AUGUST, 1929, IN BARRELS

District	Production 1928—Sept.—1929		Shipments 1928—Sept.—1929		Stocks at end of month 1928	1929	Stocks at end of Aug. 1929*
Eastern Penn., N. J. & Md.	3,610,000	3,600,000	4,141,000	3,925,000	4,987,000	4,452,000	4,777,000
New York and Maine	1,205,000	1,241,000	1,355,000	1,434,000	1,273,000	1,274,000	1,467,000
Ohio, Western Penn., W.Va.	2,276,000	1,919,000	2,559,000	2,386,000	2,159,000	2,685,000	3,152,000
Michigan	1,573,000	1,519,000	1,991,000	1,800,000	879,000	957,000	1,238,000
Wis., Ill., Ind. and Ky.	2,411,000	2,182,000	3,085,000	2,759,000	1,283,000	1,740,000	2,318,000
Va., Tenn., Ala., Ga., Fla., La.	1,433,000	1,298,000	1,475,000	1,311,000	1,634,000	1,610,000	1,623,000
East'n Mo., Ia., Minn., S.D.	1,735,000	1,670,000	2,236,000	2,325,000	1,572,000	1,426,000	2,081,000
Western Mo., Neb., Kan., Okla. and Ark.†	1,201,000	1,422,000	1,270,000	1,542,000	1,164,000	805,000	926,000
Texas	544,000	707,000	520,000	680,000	281,000	493,000	466,000
Colo., Mont., Utah, Wyo.† and Idaho†	321,000	314,000	316,000	358,000	387,000	475,000	518,000
California	1,124,000	967,000	1,102,000	1,023,000	768,000	941,000	997,000
Oregon and Washington	451,000	384,000	410,000	407,000	412,000	471,000	493,000
	17,884,000	17,223,000	20,460,000	19,950,000	16,799,000	17,329,000	20,056,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1928 AND 1929, IN BARRELS

Month	1928—Production—1929		1928—Shipments—1929		Stocks at end of month 1928	1929
January	9,768,000	9,881,000	6,541,000	5,707,000	25,116,000	26,797,000
February	8,797,000	8,522,000	6,563,000	5,448,000	27,349,000	29,870,000
March	10,223,000	9,969,000	10,135,000	10,113,000	27,445,000	29,724,000
April	13,468,000	13,750,000	13,307,000	13,325,000	27,627,000	30,151,000
May	17,308,000	16,151,000	18,986,000	16,706,000	25,984,000	29,624,000
June	17,497,000	16,803,000	18,421,000	18,949,000	25,029,000	27,457,000
July	17,474,000	17,281,000	19,901,000	20,295,000	22,580,000	24,525,000
August	18,759,000	*18,585,000	21,970,000	*23,052,000	19,374,000	*20,056,000
September	17,884,000	17,223,000	20,460,000	19,950,000	16,799,000	17,329,000
October	17,533,000	.....	19,836,000	.....	14,579,000	.....
November	15,068,000	.....	11,951,000	.....	17,769,000	.....
December	12,189,000	.....	7,384,000	.....	22,650,000	.....
	175,968,000	.....	175,455,000	.....	.....	.....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN SEPTEMBER, 1928 AND 1929, IN BARRELS

District	1928—Production—1929		Stocks at end of month 1928	1929
Eastern Pennsylvania, New Jersey and Maryland	3,280,000	3,250,000	1,296,000	1,327,000
New York and Maine	1,101,000	1,023,000	706,000	507,000
Ohio, Western Pennsylvania and West Virginia	1,748,000	1,624,000	781,000	607,000
Michigan	1,260,000	1,239,000	758,000	538,000
Wisconsin, Illinois, Indiana and Kentucky	2,073,000	1,731,000	320,000	512,000
Virginia, Tenn., Alabama, Georgia, Florida, Louisiana	1,401,000	1,150,000	827,000	680,000
Eastern Missouri, Iowa, Minnesota and South Dakota	1,519,000	1,551,000	430,000	562,000
Western Missouri, Nebraska, Kansas, Oklahoma, Arkansas†	1,095,000	1,259,000	398,000	252,000
Texas	557,000	712,000	149,000	272,000
Colorado, Montana, Utah, Wyoming and Idaho	309,000	263,000	292,000	314,000
California	1,201,000	1,020,000	1,273,000	1,060,000
Oregon and Washington	365,000	319,000	336,000	408,000
	15,909,000	15,141,000	7,566,000	7,039,000

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN AUGUST, 1929

Imported from	District into which imported	Barrels	Value
Belgium	Florida	500	$765
	Los Angeles	47,509	26,581
	Massachusetts	15,445	18,267
	New Orleans	13,073	16,182
	New York	15,050	17,179
	Oregon	10,427	13,195
	Porto Rico	3,516	8,329
	South Carolina	19,080	24,257
	Washington	250	313
	Total	124,850	$125,068
Canada	Maine & N. H.	750	$1,698
Denmark	Massachusetts	6,000	$6,300
	New York	18,094	18,994
	Porto Rico	11,500	15,267
	Total	35,594	$40,561
France	Massachusetts	739	$1,523
Germany	Los Angeles	2,000	$3,696
United K'gd'm.	New York	16,235	$21,856
	Philadelphia	3,770	5,001
	Total	20,005	$26,857
	Grand total	183,938	$199,403

EXPORTS AND IMPORTS

(Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.)

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN AUGUST, 1929

Exported to	Barrels	Value
Canada	7,874	$ 34,009
Central America	2,442	6,595
Cuba	3,991	10,832
Other West Indies and Bermuda	4,659	9,991
Mexico	20,075	61,786
South America	15,201	69,128
Other countries	5,771	33,421
	60,013	$225,762

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO, IN AUGUST, 1929

	Barrels	Value
Alaska	2,151	$ 6,479
Hawaii	22,589	54,848
Porto Rico	10,412	23,628
	35,152	$84,955

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1928 AND 1929

Month	1928—Exports—1929 Barrels	Value	Barrels	Value	1928—Imports—1929 Barrels	Value	Barrels	Value
January	56,400	$204,875	78,639	$283,002	236,771	$315,797	151,302	$177,976
February	62,828	221,620	58,886	225,590	164,408	217,525	118,930	123,123
March	74,983	265,719	69,079	235,164	235,930	330,074	131,909	112,788
April	61,676	205,882	64,145	218,316	249,458	324,371	89,668	114,281
May	70,173	236,005	57,955	219,366	190,509	256,872	200,646	267,854
June	59,536	201,313	96,055	287,612	266,537	359,637	203,545	228,170
July	83,759	291,055	71,992	247,177	112,887	151,877	182,098	199,960
August	88,736	302,866	60,013	225,762	259,975	358,471	183,938	199,403
September	71,995	252,843	.....	.....	173,439	226,295	.....	.....
October	62,137	246,010	.....	.....	152,210	226,909	.....	.....
November	69,313	260,310	.....	.....	65,969	89,732	.....	.....
December	63,120	250,204	.....	.....	175,992	233,300	.....	.....
	824,656	$2,938,702	.....	.....	2,284,085	$3,090,860	.....	.....

PRODUCTION AND STOCKS OF CLINKERS, BY MONTHS, IN 1928 AND 1929, IN BARRELS

Month	1928—Production—1929		Stock at end of month 1928	1929	Month	1928—Production—1929		Stock at end of month 1928	1929
January	11,839,000	12,041,000	9,672,000	9,642,000	July	15,981,000	15,180,000	11,707,000	11,619,000
February	11,363,000	11,255,000	12,237,000	12,436,000	August	16,202,000	*15,822,000	9,357,000	*8,993,000
March	12,501,000	12,450,000	14,463,000	14,948,000	September	15,909,000	15,141,000	7,566,000	7,039,000
April	13,844,000	14,166,000	15,002,000	15,472,000	October	15,782,000	.....	5,944,000	.....
May	16,025,000	15,445,000	14,329,000	14,911,000	November	14,930,000	.....	5,953,000	.....
June	15,940,000	15,312,000	12,944,000	13,586,000	December	13,426,000	.....	7,422,000	.....

*Revised. †The inclusion of Wyoming begins with April, 1929; of Idaho, with June, 1929. of Arkansas, with September, 1929.

Lehigh Valley Shipments Decline

CEMENT shipments out of the Lehigh Valley district, it is reported in the *Allentown* (Penn.) *Call*, have begun to recede after a summer during which they were somewhat smaller than those of a year ago. The report states that shipments as a whole out of the district during September dropped at least 20%.

Production of clinker has been stopped at the central mill of the Giant Portland Cement Co. and at Mill B of the Coplay Cement Manufacturing Co., the same newspaper report says. Both mills at this time have a sufficient stock of clinker as well as an ample supply of finished cement.

Lehigh Portland Cement Sets Off Large Blast

ON October 17, at the Metaline Falls, Wash., plant of the Lehigh Portland Cement Co., 20,300 lb. of Trojan powder, loaded in 35 well drill holes of 6-in. diameter, was set off, dislodging 56,000 tons of limestone to be used for cement manufacture. Cordeau Bickford fuse was used as detonator. A ledge of solid rock averaging 61 ft. deep, 45 ft. wide and 245 ft. long was dislodged from the mountain and shot down to the quarry floor in a well fragmented condition. This will be a sufficient supply of limestone for six to ten months' operation of the plant.

K. A. Merriman, district manager of the Trojan Powder Co., Portland, Ore., assisted in the blasting.

Worker Killed at Bloomville Quarry

CLEMENT SEIPLE, 59, worker in the Bloomville, Ohio, quarry of the France Stone Co., died at the Mercy Hospital, Tiffin, of injuries received when he was crushed between two trucks at the quarry. The workman had his chest crushed and the fractured ribs pierced the lungs and arteries. He died within a few hours after the accident.—*Tiffin* (Ohio) *Advertiser.*

Foreign Abstracts and Patent Review

Purifying Fused Cement Obtained from Phosphates. The fused cement obtained from phosphates by the volatilization of phosphorus still contains small yet exceedingly detrimental and dangerous quantities of phosphides and carbides of iron, calcium and aluminum, which thus far could not be removed from the fused bath to the required extent. But they can be rendered non-detrimental to a sufficient extent and economically when the cement, after the grinding, is submitted to an oxidizing glowing process. The ground cement leaving the mill in very hot condition is suitably passed through a glowing apparatus, in which the cement is heated to a glow in an air or oxygen atmosphere. The phosphides and carbides are thereby converted into non-detrimental and partly volatile combinations.—*German Patent No.* 473,702.

Rotary Kiln Production of Lime. The Berginspektion Ruedersdorf (Germany) lime plant is described. Two rotary, coke-fired kilns are in use, operating at temperatures from 1800 to 2000 deg. F. Much of the lime is converted into hydrate. Any silica present in the lime, as well as some possible dead-burned lime, is activated by treatment with steam under pressure. The hydrate is ground to 100% passing 25-mesh screen and 10% residue on the 76-mesh screen.

Hydraulic lime specifications in Germany call for minimum tensile strengths of 57 and 85 lb./in.^{2} on 1:3 specimens after 28- and 56-day air storage. The compressive strengths for the same conditions are, 213 and 356 lb./in.^{2}, respectively. The same minimum strengths are required for specimens stored 7 days in water.—*Tonindustries-Zeitung* (1929) **53,** 35.

Magnesia Cements. The formulas $3MgO \cdot MgCl_2 \cdot 10H_2O$ and $3MgO \cdot MgCl_2 \cdot 12H_2O$ are generally accepted for magnesia cements. Small amounts of lime (impurities in the magnesite which are detrimental) may be fixed and rendered non-injurious to the cementing action by addition of $MgSO_4$. A brief discussion on the history, composition, preparation and physical characteristics of the cements is given.—*Le Ind. del Cem.* (1928) **25,** 85.

Dolomite Bonding Materials. Dolomite bonding materials may be classified as follows: (1) Dolomite bonding materials, the chief bonding component of which is MgO; (2) dolomite lime, composed of CaO and MgO; (3) mixed dolomite lime resembling hydraulic limes; (4) dolomite cement, containing 25% and more of $SiO_2 + Al_2O_3$. When standard dolomite is heated to a high temperature, CO_2 begins to separate at 500 deg. C., the separation becomes quicker at 650 deg. C., and at 710 to 730 deg. C. almost all the CO_2 which was bound to the magnesium separates at once. CO_2 combined with calcium begins to separate at 870 deg. C. and the separation becomes more active at 900 deg. C.—*Stavivo* (1926), 118 (*Cer. Abs.*).

Hardening of Lime Mortar. Hardening of lime mortar occurs in two stages, drying and carbonation. The first may take only a few hours. Analyses of mortars up to 2500 years old shows that carbonation is not complete even in that time. The presence of MgO results in less absorption of CO_2. Thermodynamically $CaSiO_3$ would be decomposed by CO_2 up to 140 deg.; above that the reverse would occur. Liberation of CO_2 from $CaCO_3$ by active forms of SiO_2 occurred at 873 deg. but not at room temperature. Quartz did not show appreciable action on $CaCO_3$ at 800 deg. X-ray examination showed $CaCO_3$ but no $CaSiO_3$ in mortars 580 and 970 years old. Tables of analyses of five mortars aged 430 to 970 years are given. Talc did not form $MgCO_3$ at 80 lb. CO_2 pressure in 6 hr. at 200-400 deg.—*Zeit. Electrochem* (1929), **35,** 308.

Hydraulic Lime. Lime residue from defecating sugar solutions is mixed with clay and burned to produce hydraulic lime or cement.—*French Patent No.* 656,892.

Magnesia from Dolomite. Burnt dolomite is treated with an NH_4 salt such as NH_4Cl to extract the lime content as a soluble salt. Waste liquors from the Solvay soda process or from the treatment of Mg NH_4 carbonate with KCl may be used for the extraction.—*British Patent No.* 301,751.

Portland Cement and Sulfuric Acid from Calcium Sulphate. Complete combustion of the reducing fuel (coke, etc.), is effected before it enters the clinkering zone, by reduction of the CO_2 to CO, with addition of definite amounts of heat. The SO_2 is converted to H_2SO_4 (sulfuric acid).—*Belgian Patent No.* 354,788.

Testing for Volume Constancy of Portland Cement. Changes in the composition of portland cement on aging are discussed. Experimental work showed that Faija's method of testing soundness of cement is not sufficiently severe. Heinzel's method and drying at 120 deg. bear no definite relationship to the properties of cement and should be discarded as misleading. Boiling in water results in hydration of the cement and though the process is not exactly the same as encountered in aging under normal conditions, its use can be recommended. Of these methods that of Le Chatelier is the most exact. Drying at 120 deg. followed by steam treatment is very promising, but considerably more work must be done before this method becomes practical. Storage for 28 days under water gives valuable results and cannot be discarded.—*Zhur. Prikladnoi Khim.* Leningrad (1929), **2,** 303.

High Alumina Cement. A mixture of lime and bauxite or other high-alumina material is subjected to the action of steam and then heated to a higher temperature but somewhat below the melting point.—*N. V. S. Knibbs,* British Patent No. 303,639.

Preliminary Investigation of the Eckel Process for the Production of Iron Slag Cement. Tests on high-grade ilmenite from Quebec containing TiO_2 35-40%, Fe_2O_3 50-55%, SiO_2 5% and low CaO and Al_2O_3 showed that Ca titanate may be formed at high temperatures and as slag may be separated from the metallic Fe. In order to produce cement the acid and lime ratios must be carefully adjusted.—*Can. Dept. of Mines. Rep. No.* 64, **162.**

Waterproof Hydraulic Cements. Chlorides of calcium, aluminum, titanium, tin, iron, strontium or hydrochloric acid are used to accelerate setting and hardening and to render the set product oil and water-proof. —British Patent No. 301,509.

Waterproof Concrete. Water-tight concrete is prepared from mortar by the addition of up to 10-12% by volume of mineral and fatty oil; and up to 30% of asphalt tar, fuel oil, etc. An excess of this mixture increases the impermeability of concrete and decreases its strength. This process is covered by the Russian (Soviet) patent No. 4939.—*Neftyanoye Khozyaistvo* (1929), **16,** 561.

Linings for Rotary Kilns. Highly refractory materials, such as corundum, zirconium, etc., are mixed with *ciment fondu* and water; blocks, etc., formed from the mixture are allowed to set.—French Patent No. 618,089.

Early-High Strength Cements. General data on high-early-strength cements of the portland, alumina, iron-ore types.—*Le Ind. del Cem.* (1928) **25,** 8.

Magnesia Salts from Magnesite. Magnesite is treated with $(NH_4)_2SO_4$, the resulting $(NH_4)_2CO_3$ separated as a sublimate and the $MgSO_4$ leached out. The magnesia residue is calcined.—*Australian Patent No.* 12,403.

Italian Cement Industry. Ferrari gives a brief illustrated description of 14 leading Italian cement mills.—*Le Ind. del Cem.* (1929), **25,** 3.

Influence of Sugar Admixtures on the Setting and Hardening Properties of Portland Cement. The setting of portland cement is accompanied by crystalline and gel formations from which crystals are eliminated. The type, sequence and quantitative relation of these eliminations must be adjusted to each other in a definite manner if the setting process is to continue normal. The action of additions of sugar, which is a retarder, were studied microscopically under various storage and other test conditions. It was found that additions of sugar to the make-up water affected the crystal formation and produced an excessive gel formation. Additions of sodium carbonate, which is an accelerator, produced increased crystal formation with a vigorous elimination of calcium carbonate.—*Zement* (1929) **18,** 12, 14, 15.

Alumina Cement. Chanin assumes a typical composition of alumina cement to be: lime, 40%; alumina, 40%; silica, 10%; iron oxide, 10%. The properties and applications of these cements are given.—*Rev. de Mat. de Constr.* (1929), 235.

Modern Italian Iron-Portland Cement Plants. Richter describes the Bagnoli and Portoferrario plants, giving general data on the design.—*Le Ind. del Cem.* (1929) **25,** 5.

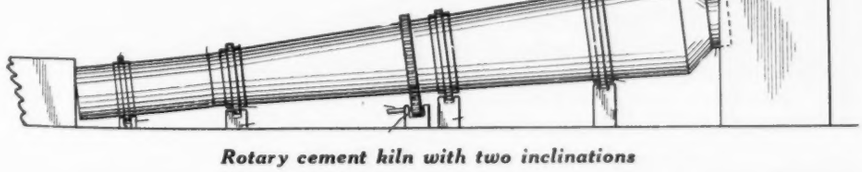
Belgian Cement Specifications. Complete specifications for testing cements are given.—*Rev. des Mater. de Constr. et ae Trav. Pub.* (1929) 234.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

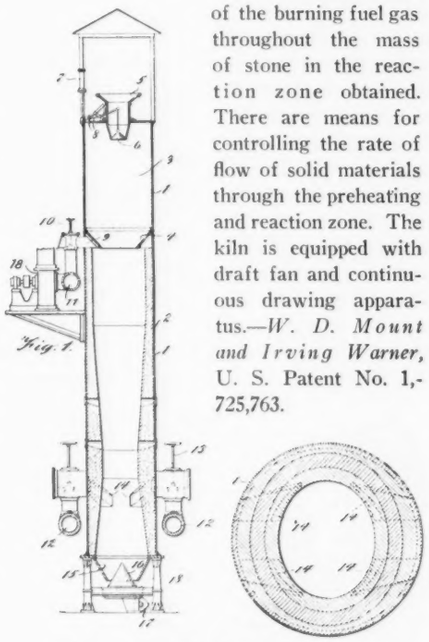
Plaster Surfacing Material. The invention pertains to the forming of a surfacing material suitable for the production of a monolithic plaster effect on non-shrinkable wallboard construction. An example of a desirable formula is: Casein, 12 parts; borax, 2 parts; fine ground asbestos fiber, 40-50 parts; a pigment (lithopone, etc.), 15-20 parts; hydrated dolomitic lime, 5 parts. —*C. K. Roos (assignor to U. S. Gypsum Co.),* U. S. Patent No. 1,606,722.

Rotary Cement Kiln. The kiln has two inclinations, which are said to permit slow travel of raw material through the first portion and later an accelerated travel rate through the latter portion. The objects of the invention are: Increased production per kiln; greater heating area at feed end, permitting a greater transfer of heat to the material, thus cutting down on fuel and stack losses; slowing up velocity of gas with resultant transfer of heat to the material in the kiln; greater volume of material treated, thereby increasing the grinding effect within the kiln; elimination of "rings" by reason of the funnel shape of the kiln, etc. *M. S. Price,* U. S. Patent No. 1,727,217.



Rotary cement kiln with two inclinations

Shaft Lime Kiln. The invention pertains to a shaft kiln which permits close chemical control of the reactions and a more uniform distribution of the burning fuel gas throughout the mass of stone in the reaction zone obtained. There are means for controlling the rate of flow of solid materials through the preheating and reaction zone. The kiln is equipped with draft fan and continuous drawing apparatus.—*W. D. Mount and Irving Warner,* U. S. Patent No. 1,725,763.

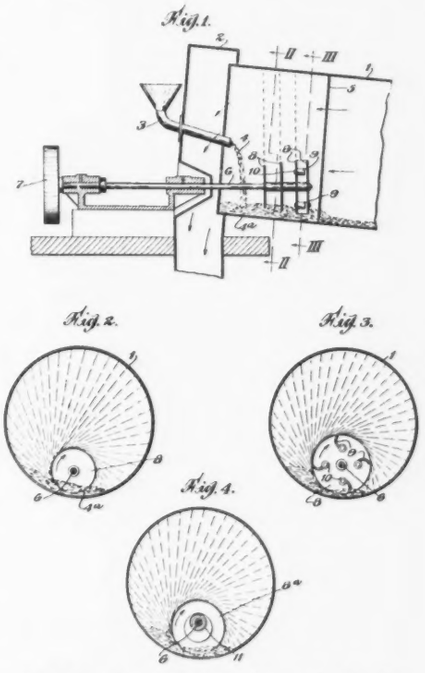


Shaft lime kiln featured by close operation control

Printing Wallboard. The patent relates to a means for imprinting wallboard surfaces with display matter, ornamental workings, etc., during the continuous production of the board.—*John Schumacher,* U. S. Patent No. 1,719,199.

Hollow-Cored Wallboard. Continuous method of making hollow-cored wallboard in different sizes similar to the ordinary partition block. The paper cores are formed continuously and moved lengthwise as they are formed, the cementition material being deposited upon and about them and moving along with the cores; the plaster is formed to the shape and dimensions of the board as it is moved along. The hollow cores for forming the openings in the wallboard remain thus as a permanent part.—*Caleb Payne (assignor to Gypsum Engineering and Manufacturing Co.),* U. S. Patent No. 1,720,855.

Rotating Slurry Distributor for Cement Kilns. In the embodiment of the invention illustrated in Figs. 1, 2 and 3 the kiln *1,* of which only the upper or feeding end is shown, is projected into the kiln head *2.* The slurry, in this instance, is delivered through a chute *3* and is discharged, as indicated at *4,* into a slurry receiving chamber *4a* which is shown as a part of the kiln structure itself, being defined by an annular partition *5.* A shaft *6,* suitably supported in bearings outside of the kiln head and rotated at relatively high speed by any convenient means, sufficiently represented by the pulley *7,* is extended into the slurry chamber *4a* and bears discs *8,* two of which are shown as plain discs, while the other two are shown as supporting between them wings *9,* adapted to swing on pins *10* supported by the discs. This distributing device, as indicated in



Details of a rotating slurry feed distributor for cement kilns

Fig. 1, dips into the slurry which may be permitted to accumulate somewhat in the bottom of the rotating slurry chamber and takes up the slurry which, under the influence of the centrifugal action, is thrown off in a finely divided condition into the path of the combustion gases, as indicated in Figs. 2 and 3. The contact surface between the slurry and the combustion gases is thus made very large and the slurry is brought into contact with practically all of the combustion gases and is thereby caused to lose its water and to be subjected very quickly to the action of the combustion gases.—*John S. Fasting (assignor to F. L. Smidth and Co., New York),* U. S. Patent No. 1,720,786.

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Sept. 21	Limestone Flux Week ended Sept. 28	Sand, Stone and Gravel Week ended Sept. 21	Sand, Stone and Gravel Week ended Sept. 28
Eastern	4,100	3,859	18,030	17,898
Allegheny	4,267	4,338	10,809	11,810
Pocahontas	349	360	1,395	1,378
Southern	715	1,013	9,855	9,395
Northwestern	1,405	1,466	9,565	9,862
Central Western	622	581	12,905	14,221
Southwestern	667	707	9,531	10,113
Total	12,125	12,324	72,090	74,677

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1928 AND 1929

District	Limestone Flux 1928 Period to date Sept. 29	Limestone Flux 1929 Period to date Sept. 28	Sand, Stone and Gravel 1928 Period to date Sept. 29	Sand, Stone and Gravel 1929 Period to date Sept. 28
Eastern	115,061	131,208	419,655	430,438
Allegheny	132,062	140,118	284,699	277,236
Pocahontas	18,189	14,679	31,558	37,634
Southern	22,784	21,484	410,973	344,943
Northwestern	52,490	43,760	256,555	243,704
Central Western	17,124	20,162	399,619	407,344
Southwestern	15,957	19,098	240,116	261,385
Total	373,667	390,509	2,043,175	2,002,684

COMPARATIVE TOTAL LOADINGS, 1928 AND 1929

	1928	1929
Limestone flux	*373,667*	*390,509*
Sand, stone, gravel	*2,043,175*	*2,002,684*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning October 19:

SOUTHERN FREIGHT ASSOCIATION DOCKET

47453. **Limestone and limestone screenings,** from Birmingham, Ala. (when from Dolcito and Ketona, Ala., also when from Gate City, Ala.), to Atlanta, Ga., and Group. It is proposed to cancel the rate of 113c per ton applicable on limestone and limestone screenings, carloads, from Birmingham, Ala. (when from Dolcito and Ketona, Ala.), to Atlanta, Ga., and Group, published in Agent Glenn's I. C. C. A573, permitting the rates as published in L. & N. R. R. I. C. C. A15801, and Agent Glenn's I. C. C. A655 to apply. Also to cancel the rate of 113c per ton applicable on limestone and limestone screenings, carloads, from Birmingham, Ala. (when from Gate City, Ala.), to Atlanta, Ga., and Group, account of no movement.

47483. **Stone, crushed, rubble or broken,** from Pounding Mill, Ripplemead, Pembroke and Miles, Va., to Southern Ry. stations, Avoca, Tenn., to Mountain City, Tenn., inclusive. It is proposed to establish rate on stone, crushed, rubble or broken, carloads (See Note 3), from the origins mentioned to Southern Ry. stations, Avoca, Tenn., to Mountain City, Tenn., inclusive, on basis of Docket 17517 joint line scale.

47488. **Stone, marble, calcite, limestone, slate or whitestone,** from Alabama, Georgia, North Carolina and Tennessee shipping points to Peru, Ind. Combination rates now apply. It is proposed to establish commodity rates on stone, marble, calcite, limestone, slate or whitestone, as described in Item 359-A, of Agent Glenn's I. C. C. A-657, from the points named below to Peru, Ind., the same as in effect to Logansport, Ind. The origins involved are: Tate, Whitestone, Mineral Bluff, Ga., Kinsey, N. C., Cartersville, Fairmount, Bolivar, Ga., Tellico Plains, Tenn., Louisville, Marmor, Pinkmar, Kingsley, Pickford, Knoxville, Concord, Tenn., Brownson and Gantt's Quarry, Ala.

47531. **Marble dust,** from Brownson and Gantts Quarry, Ala., to South Bend, Ind. The present rates on **crushed marble,** carloads (Description K), and **marble dust** (Description L), from Brownson and Gantts Quarry, Ala., to **South Bend, Ind., are** erroneous. The following changes are proposed to place these rates on the proper basis. In cents per net ton.

Description K—Present, 460; proposed, 500.
Description L—Present, 489; proposed, 579.
The descriptions are shown in Agent Glenn's I. C. C. A657.

47535. **Calcite, ground or pulverized,** from Sparta, Tern, to Bucyrus, O. Present rate, 543c per net ton. (Cincinnati combination.) Proposed rate on calcite, ground or pulverized (ground or pulverized limestone or marble), carloads (See Note 1), except when car is loaded to full visible capacity actual weight will apply. (Not subject to Rule 34 of Southern Classification), from Sparta, Tenn., to Bucyrus, O., 457c per net ton. Same as current rate to Sandusky, O.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

47540. **Shale, etc.,** between stations on the Georgia & Florida R. R. It is proposed to establish a mileage scale of rates applicable between stations on the G. & F. R. R. on shale, in bulk, carloads; **flagging, rubble or stone screenings,** in bulk, in straight or mixed carloads (Please see Note 3). The proposed scale ranges from 50c per ton for 5 miles up to 86c per ton for 50 miles; 108c for 100 miles, 131c for 150 miles, 144c for 200 miles, and 171c per net ton for 320 and over 300 miles.

47543. **Sand,** from Lipe, Tenn., to Terrell, Ark. Present rate, 210c per net ton. (Memphis combination.) Proposed rate on **sand** (except asbestos sand and silica sand), carloads (See Note 3), from Lipe, Tenn., to Terrell, Ark., 151c per net ton.

47618. **Sand and gravel,** from Ellerslie, Petersburg and Warmore, Va., to eastern and Virginia points. It is proposed to establish rate of 170c per net ton on sand and gravel in straight or mixed carloads (See Note 3), from Petersburg, Warmore and Ellerslie, Va., to Washington, D. C. It is also proposed to cancel the through rate of 189c per net ton on sand and gravel from Petersburg, Va., to Alexandria, Fredericksburg, Potomac Yard and Quantico, Va., leaving Richmond combination of 139c per net ton in effect.

SOUTHWESTERN FREIGHT BUREAU DOCKET

18586. **Sand,** between points in the southwest. To establish on **silica sand,** carloads, minimum weight 80,000 lb., or if marked capacity of car is less than 80,000 lb., marked capacity will govern, between points in Arkansas and points in Oklahoma and Texas; between points in Louisiana and Texas; between points in Missouri and points in Kansas, Oklahoma and Texas; between points in Oklahoma and points in Kansas, Arkansas, Louisiana and Texas, the same scale of rates as published in Item 445, S. W. L. Tariff 114-D, which are the result of the order of the I. C. C. in Docket 9702.

To eliminate the complaints pending before the Interstate Commerce Commission as to rates on silica sand, carloads, as well as place the various producing points, also consuming points on an equality, the sand scale of rates as outlined above, is suggested.

ILLINOIS FREIGHT ASSOCIATION DOCKET

5092-A. To establish commodity rate of 88c per ton of 2000 lb. on **silica, crude or ground,** carloads, from Olive Branch, Ill., to Tamms, Ill., for single line haul.

WESTERN TRUNK LINE DOCKET

7052. **Sand,** carloads, from Kerrick, Minn., to Milwaukee, Wis. Present rate, 14½c per 100 lb.; proposed, 12½c per 100 lb.

2079-J. **Stone, rubble,** carloads, from Lannon, Wis., to Cleveland, O. Rates—Present, 27c per 100 lb.; proposed, 18½c per 100 lb.

496-O. **Sand, gravel or stone (crushed, chip, dust, rip rap or rubble),** carloads, from Weeping Water, Neb., to points in Missouri on the C. B. & Q. R. R. Present, combination rates. Proposed—Establish for joint line application the same scale of rates as now applies from **Louisville, La** Platte, Neb., to points on connecting lines, shown on page 4, C. B. & Q. R. R. Tariff 16060-H, I. C. C. No. 17126. Minimum weight, present, various; proposed (See Note 2), except when weight of shipment loaded to full visible capacity is less than 90% of marked capacity actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb.

4823B. **Limestone,** carloads, as published in Item 2535 of U. P. Tariff 3000F, I. C. C. No. 3768, from Zeigler, Kan., to Kansas City, Mo., and St. Joseph, Mo. Present rate, 8c per 100 lb.; proposed, to cancel Item.

CENTRAL FREIGHT ASSOCIATION DOCKET

22945. To establish on **sand and gravel,** carloads, from Gosport, Ind., on the **C. I. & L. Ry.,** to Seymour, Fleming, Hayden, Witcomb and North Vernon, Ind., rate of 110c per net ton. Present, class rates.

22958. To establish on **sand and gravel,** carloads, from Troy, O., to points in Ohio, rates as shown in Exhibit "A" attached. Present rate, sixth class.

EXHIBIT "A"

Proposed rates to Ohio points

C. C. C. & St. L. Ry. (Sandusky Div.)			
Bowlusville	75	Huntsville	90
Urbana	80	Silver Creek	95
West Liberty	85	Kenton	100
Indianapolis Div.			
Gretna	90	Dawn	105
Pemberton	95	Union City	115
Hardin	100		
Cincinnati Northern Ry.			
Celina	95	Ft. Jefferson	70
Coldwater	90	West Manchester	75
Gilberts	85	Stone Siding	80
Ansonia	80	Farmersville	85
Greenville	75	Franklin	90

22963. To establish on **sand and gravel,** carloads, from Wolcottville, Ind., to Wakarusa, Ind., rate of 70c per net ton. Routes—Via Wabash Ry. direct. Present rate, 75c per net ton.

22954. To establish on **sand and gravel,** carloads, from Winona Lake (Warsaw), Ind., to Rivare, Ind., rate of 95c per net ton. Present rate, sixth class rate of 14c per 100 lb.

22987. To establish on **crushed stone,** carloads, from Greencastle, Ind., rate of 60c to Danville and 65c per net ton to Avon, Ind. Present rates, 63c to Danville, Ind., and 70c per net ton to Avon, Ind., per C. C. C. & St. L. Ry. Tariff 1770W.

22988. To establish on **crude silica sand,** carloads, from Pacific and Grays Summit, Mo., to Terre Haute, Ind., rate of $2 per net ton. Present rate, $2.52 per ton as per Mo. Pac. Tariff 172-AE and Frisco Tariff 162-B.

23020. To establish on **crushed stone,** carloads, from Melvin, O., to Miami, Fernald and Willeys, O., rate of $1 per net ton. Present rate, $1.13 per net ton.

23022. To establish on **sand and gravel,** carloads, from Urbana, O., to Lake View, O., rate of 60c per net ton. Present rate, sixth class rate of 11½c.

TRUNK LINE ASSOCIATION DOCKET

21904. **Limestone, ground, precipitated or pulverized,** and **limestone dust,** carloads, minimum weight 50,000 lb., from Atlas, Hamburg and Lime Crest, N. J., to points on D. L. & W. R. R., Passaic and Delaware branch, New Providence, N. J., to Gladstone, N. J., inclusive, 7½c per 100 lb. (Present rate, 8½c per 100 lb.) Reason—To meet motor truck competition.

21916. **Crushed stone,** carloads (See Note 2), from Devault, Penn., to Corbit, Del., 90c per net ton. (Present rate, $1.05 per net ton.) Reason—Proposed rate compares favorably with rates to Colora and Elkton, Md., and Glasgow, Del.

21920. **Gravel and sand,** N. O. I. B. N., in O. C., except blast, engine, foundry, glass, molding, quartz, silex and silica (See Note 2), from Kenvil and Succasunna, N. J., to Glenburn and Dalton, Penn., $1.25 per net ton. (Present rate, $1.40 per net ton.) Reason—Proposed rate is same as now published to Clarks Summit, Penn.

21924. **Stone, crushed or quarry, broken,** carloads (See Note 2), from Jamesville, N. Y., to N. Y. O. & W. Ry. stations, Burnside, N. Y., to Summitville, N. Y., inclusive, $2.25 per net ton. (Present rate, $2.40 per net ton.) Reason—Proposed rate compares favorably with rate from Jamesville to Hoboken, N. J.

21944. To increase switching charges at Sayre, Penn., shown in Lehigh Valley R. R. Tariff I.C.C. C8160, as follows:

Name—Sayre Sand and Plaster Co. Business—**Sand and gravel.** Switching charges per car—when traffic has paid or will pay a road haul, $4.95. When traffic has not paid a road haul, $6.30.

Change to read: Sayre Sand and Plaster Co., sand and gravel. When traffic has paid or will pay a road haul, $5.85. When traffic has not paid a road haul, $6.75.

And to add to Tariff I. C. C. C8160: From Sayre Sand and Plaster Co., sand and gravel, to Sayre Water Co., switching charges when traffic has not paid a road haul, $6.75 per car.

Reason—To place all shippers and consignees at Sayre, Penn., on the same basis.

21948. **Sand,** carloads (See Note 2), from Menantico, N. J., to Gloucester and Westville, N. J., 81c per net ton. (Present rate, 92c per net ton.) Reason—Proposed rate compares favorably with rates on like commodities from and to points in the same general territory.

21950. **Fluxing limestone,** carloads (See Note 2), from Bittinger and Thomasville, Penn., to Steelton, Penn., $1.01 per gross ton. (Present rate, $1.20 per gross ton.) Reason—Proposed rate is comparable with rates from York, Penn., to Steelton, Penn., and Newport, Penn., and from Thomasville, Penn., to Coatesville, Penn., and from Spring Grove, Penn., to Newport, Penn.

21978. (A) **Sand,** other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads; (B) **crushed stone,** carloads (See Note 2), from Morrisville, Penn.:

	Proposed		Present	
To	(A)	(B)	(A)	(B)
Branchport to Elberon, N. J.	90	90	105	104
Deal to Avon, N. J.	90	....	105	90

Proposed rates in cents per 2000 lb.

Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

21984. **Sand and gravel,** carloads (See Note 2), from South Lakewood and Farmingdale, N. J., to Whitings, N. J., 60c per net ton. (Present rate 92c per net ton.) Reason—To meet motor truck competition.

22011. **Crushed stone,** carloads (See Note 2), from LeRoy, N. Y., to Conesus and Webster, N. Y., 83c per net ton. (Present rate 91c per net ton. Reason—Proposed rate is fairly comparable with rates to Rochester, Lancaster and Depew, N. Y.

22018. **Crushed stone,** carloads (See Note 2), to Millerstown, Penn., from Steelton, Lemoyne, Penn., 85c per net ton, and from J. C. Stahl, Penn., $1.10 per net ton. Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

Crushed Stone Rates from Lehigh, Ill., to Indiana and Michigan

IN No. 21894, Lehigh Stone Co. vs. B. and O., another of the considerable number of cases involving rates on crushed stone, sand and gravel around Chicago, Ill., and adjoining parts of Indiana and Michigan, Examiner Burton Fuller has recommended that the Interstate Commerce Commission find rates on crushed stone, including agricultural limestone, from Lehigh, Ill., to destinations in northern Indiana and to New Buffalo, Mich., unreasonable, unduly prejudicial to the complainant and unduly preferential of producers of crushed stone in the Chicago district, and of sand, gravel and crushed stone at Joliet and Plainfield, Ill., and in Indiana. In addition he recommends that the Commission find the rates unjustly discriminatory as between interstate and intrastate commerce. The finding recommended follows the allegations of the complaint.

The common rate adjustment, made in 1917, which began to be changed after the 10% reduction in 1922, according to Fuller, has been almost completely destroyed. The carriers, he said, were willing to restore the grouping of March 1, 1917. Shippers in the Chicago district were willing to have the adjustment restored in part. Except the Elgin, Joliet and Eastern, the proposed, the restoration of the grouping is on the basis of the Kickapoo scale, using average distances from all points in the Chicago-Joliet-Lehigh group.

Examiner Fuller recommended the removal of the unreasonableness, undue prejudice and unjust discrimination, as follows:

(1) By the establishment from the Chicago-Joliet-Lehigh group to all points in the destination territory with the exceptions hereinafter noted of rates based on the average of the single and joint-line Kickapoo scales for distances up to 100 miles, the rate to each destination to be based on the average short-line distance from the origin group and to apply in connection with each destination line, except that it need not apply to destinations between San Pierre and Michigan City in connection with the C. I. and L. from the Chicago district, Joliet or Plainfield, and (2) by the establishment from the Indiana points of rates based on the Kickapoo scale subject with respect to destinations intermediate between the Indiana points and the Chicago-Gary district to the rates prescribed in the Chicago Gravel Cases, 118 I. C. C. 633, and related state cases, as maxima, (3) by the establishment to destinations on the E. J. and E., the New York Central west of San Pierre and the Dinwiddie branch of the C. I. & L. from the respective Illinois origins, and to destinations on the C. I. and L. San Pierre to Michigan City in connection with that line from Joliet, Plainfield and the Chicago district, of rates which shall be based on the average on the same percentage of the one or two-line Kickapoo scale, as the case may be, as applies from the Indiana origins, using the short-line distance from each of the respective origins.

Southwestern Gravel Distance Rule Prescribed

IN A supplemental report, written by Chairman Lewis in No. 17000, part 11, sand, gravel, crushed stone and shells within the southwest, the Interstate Commerce Commission has prescribed a rule to govern the carriers in computing distances for applying the rates prescribed in the original report, 155 I. C. C. 247, to be effective December 5. In addition it has eliminated, upon the petition of the southwestern lines, points located on the Mississippi River from the findings. The eliminated points are east and west bank points, rates from which, according to the declaration of the southwestern lines, are controlled by railroads east of the Mississippi. The southwestern lines, are controlled by railroads east of the Mississippi. The southwestern lines, in support of their application for elimination, also pointed out that the rates in question were covered by I. and S. No. 3250, now pending.

Eliminated points are origin points either on the west or east bank and the rates therefrom apply to destinations on the other bank of the river. The origin points embraced in the elimination appendix to the report are: St. Louis, Mo.; Memphis, Tenn.; Helena, West Helena and Outer Yards, Ark.; Vicksburg, Miss.; Natchez, Miss.; Baton Rouge, North Baton Rouge, Angola, Harahan, and points in the switching district of New Orleans, La., located on the west bank.

According to the report, the railroads construed the rule for computing distances prescribed in the first report to authorize them to hold the rate between any two points to a basis not lower than that obtained by applying to the shortest distance between such points either the single-line or joint-line scale according as to whether such shortest distance was made over a single- or a joint-line route. Instead of that the Commission said the railroads should observe the following rule:

In computing distances, the shortest single-line routes over which carload traffic can be moved without transfer of lading shall be used in connection with the single-line scale, and the shortest joint route over which carload traffic can be moved without transfer of lading shall be used in connection with the joint-line scale.—*Traffic World.*

Louisiana Gets New Gravel Rates

A NEW set of freight rates on sand and gravel shipments in north Louisiana was promulgated by the Louisiana Public Service Commission recently as the latest chapter in the long controversy over such rates.

The commission, on a reopening of the rate cases sought by the Texas-Louisiana tariff bureau on behalf of all railroads operating in the state west of the Mississippi river, abolished the special low public works rates on road building materials on all shipments sent into north Louisiana from Louisiana points west of the Mississippi and from Angola, Baton Rouge, Harahan and New Orleans on the east side, and on all shipments moving between points in the northern district.

The district begins where the Vicksburg, Shreveport and Pacific railroad of the Y. and M. V. system crosses the state. The effective date of the order was October 17, and brought into play a schedule higher than the public works rates but lower than the present commercial rates. Shipments moving out of the district are not affected, but will be handled under prevailing schedule.

The schedule ranges from 50 cents a ton on a ten-mile haul to $3.50 a ton on an 800-mile haul.—*Jackson* (Miss.) *Clarion-Ledger.*

Rates Crushed Stone, Ohio Quarries to Detroit, Mich.

THE Interstate Commerce Commission has set Investigation and Suspension Docket 3352 for hearing on November 11, at the Hotel Hollenden, Cleveland, Ohio, before Examiner Wilbur. This case covers suspension of a number of tariffs of railroads contemplating a revision in their rates on crushed stone from quarries in Ohio to Detroit, Mich. A tabulation of present and proposed rates from Ohio points follows (rates in cents per net ton):

	Pres.	Susp.		Pres.	Susp.
Gibsonburg	85	90	Findlay	95	100
Holland	85	90	Marblehead	95	100
Luckey	85	90	Sandusky	95	100
Maple Grove	85	90	Waterville	95	95
Martin	85	90	Carey	95	105
Silica	85	90	McVittys	95	110
Whitehouse	85	90	N. Baltimore	107	100
Woodville	85	90	Ransoms	95	105

The case is somewhat a sequel of the decision of the Interstate Commerce Commission in I. and S. Docket 2912, decided December 19, 1927 (Crushed Stone-Gibsonburg, Maple Grove and Woodville, Ohio, to Detroit, Mich.), in which the commission approved 85 cents per ton from these quarries to Detroit, Mich.

Rates from competing quarries have never been satisfactorily adjusted with relation to the rates fixed by the commission, and now the carriers have undertaken a complete revision which, however, has again come before the commission in this I. and S. proceeding.

Cement as Company Material

EXAMINER T. Naftalin has proposed the dismissal of No. 22039, Louisville Cement Co. vs. Pennsylvania, on a finding that the local rates to Louisville, Ky., charged on through shipments of "company material" cement, from Speed, Ind., to destinations on the Louisville and Nashville in Kentucky, Tennessee and Virginia were inapplicable and that the applicable rates were the through rates to destinations. He said that the adjustment of the charges collected and those technically outstanding as between the carriers was not within the jurisdiction of the Commission.

The complainant contended that the rates were unjustly discriminatory, inapplicable and unduly prejudicial on shipments between July 21, 1925, and April 11, 1928. Under its contract with the L. and N., or the latter's contractor, it was understood, said the examiner, that the complainant would assume, out of the price to be paid for the cement, such proportion of the rate from Speed to destinations as accrued to the Pennsylvania for its haul to Louisville, the terms of sale reading "f. o. b. L. and N. tracks, Louisville, Ky." The shipments moved on through bills of lading, marked prepaid to Louisville.

In each instance, said the examiner, the through rates on continuous shipments were less than the aggregate of intermediates. The complainant contended that the local rate to Louisville was inapplicable, as the shipments were destined to points beyond. Defendant erred, the examiners said, in applying the charges collected to the satisfaction, in full, of the hauls to Louisville. In effect, the money collected, he said, should have been applied as partial prepayment of the through rates. He said that the Commission should find that the local rate charged, 6.5 cents per 100 lb., Speed to Louisville, was inapplicable; that the applicable rates were the through rates from Speed to destinations; that the complainant made the shipments and paid the charges; that as company material no additional charges were collected; that for the through movement technical undercharges are outstanding; and that the adjustment of the charges collected and those technically outstanding as between the carriers, and as between the complainant and the consignees, under the terms of their respective agreements, is a subject matter not within the jurisdiction of the Commission.—*Traffic World.*

Roofing Slag Scale

NEW rates on roofing slag, to be established not later than December 30, 1929, have been ordered in No. 21646, M. N. Cartier and Sons Co. vs. New Haven et al., from points of origin in Pennsylvania to destinations in New England. The Interstate Commerce Commission, by division 2, has found unreasonable the past rates from Reading, Hokendauqua, Bethlehem and Swedeland, Pa., to Providence, Auburn, Esmond and Cranston, R. I., and Attleboro, Mass., and awarded reparation. It has found rates from Reading and Swedeland to the same destinations unreasonable for the future and awarded reparation. Inasmuch as the rates from Bethlehem and Hokendauqua were on the basis sought, the Commission said they needed not to be considered for the future. The finding is that the rates from Bethlehem and Hokendauqua were, and the rates assailed from Reading and Swedeland were, are, and for the future will be unreasonable to the extent that they exceeded, exceed, or may exceed the rates shown in the following table, subject to the addition of 70 cents per ton to the rates, for hauls involving car float or lighterage service in New York harbor, and subject to other conditions set out after the scale:

Distance	Rate Cents
125 miles and over 100	150
150 miles and over 125	160
175 miles and over 150	175
200 miles and over 175	185
230 miles and over 200	200
260 miles and over 230	210
290 miles and over 260	225
320 miles and over 290	235
350 miles and over 320	250

The other conditions to which the rates carried in the scale are to be subject follow:

Distances shall be computed over the routes composed of not more than three line-haul carriers, via existing connections for the interchange of carload traffic, which will result in the lowest rates, taking into consideration the arbitrary for float service. In computing the rates for hauls involving car-float or lighterage service in New York Harbor, only the actual rail distance shall be used, the 70-cent arbitrary being intended to cover the entire water service. The prescribed rates will be required to be established only over the cheapest available routes under the foregoing requirements. Rates based upon the foregoing scale and the average or representative distances from groups agreed upon by the carriers and interested shippers will be considered a substantial compliance with our findings.

Crushed Stone to Ohio Points

THE Public Utilities Commission of Ohio in Docket 5576, decided September 25, handed down an interesting decision. The commission had before it rates on crushed stone from Lewisburg, Ohio (on the Cin. Nor. R. R.), and Piqua, Ohio (on the B. and O.-Penna. R. R.), to Fernald and Miami, Ohio, local points on the C. and D. R. R. in Hamilton county, immediately west of Cincinnati. The commission was presented with the interesting problem of group rates, i. e., how far and to what extent origin competitive points of production can and should be grouped. The case hinged largely on the rate of $1.00 from Centerville, Ohio (a quarry on the Pennsylvania R. R.), to Miami and Fernald, Ohio. The distance and rates from Centerville, Ohio, compared with complaining points of production are:

From	To Fernald, O. Miles	To Fernald, O. Rate*	To Miami, O. Miles	To Miami, O. Rate*
Centerville, Ohio	66	$1.00	61	$1.00
Lewisburg, Ohio	84	1.13	79	1.13
Piqua, Ohio	109	1.20	104	1.10

*Per ton.

The commission also pointed to rates from other operations reaching this territory. The conclusion reached was that $1.00 per ton would be a fair and reasonable rate from the three quarries named on the premise that a group or competitive adjustment of rates is more desirable than a rigid mileage scale of rates.

I. C. C. Reports

Cement. No. 20748, Lehigh Portland Cement Co. vs. C. & O. et al. By division 5. Combination rate on a carload of cement, Chapman, Penn., to Quinwood, W. Va., inapplicable in so far as it was subject to reduction pursuant to the Jones combination rule. Applicable rate $5.99 per net ton. Reparation awarded of $1.89 from all the defendants and $27.79 from the Reading, Western Maryland, N. & W. and C. & O. Commissioner Farrell dissented in part for reasons stated by him in Lehigh Portland Cement Co. vs. C. & O. 152 I. C. C. 351.

Book Reviews

Colloid Symposium Monograph

FIFTH SYMPOSIUM ON COLLOID CHEMISTRY, edited by Harry Boyer Weiser for the Colloid Division of the American Chemical Society. Published by the Chemical Catalog Co., New York, 1928. Price $6.50.

A VOLUME recently received is the "Fifth Symposium on Colloid Chemistry," gotten out by the Colloid Division of the American Chemical Society. Although this book covers a wide range in the colloid chemistry field, only those portions of it that specifically relate to the rock products industry are reviewed here. Already one chapter from the volume, that on "Hydrated Portland Cement as a Colloid," by Alfred H. White, has been published, by special permission, in the issue of ROCK PRODUCTS for April 28, 1928.

The monograph has an introductory chapter on "Unity in the Theory of Colloids," by H. R. Kruyt, in which he outlines the aim of this branch of the science. As is pointed out, there is no question but that colloid chemistry is helping to clear up a host of the mysteries surrounding problems in all industries. In the rock products field it has helped to give understanding to the subjects of plasticity, crystallization bonding action, stabilization and the mechanics of the setting reactions of cements and plasters. In this book, chemists of the industry will find considerable data and theoretical discussion of interest.

In the second chapter, William D. Harkins tabulates his notes on the study of the stability of films, emulsions and foams. He also gives a method of determining the relative stability of these films. There is much that might be of interest to producers of cement and plaster, especially concerning the manufacture of porous tile, in which process an emulsion of a gas in a semi-liquid plastic is used to produce the porous structure. A certain degree of film stability and a minimum movement of the entrained gas bubbles are necessary for the successful application of the process.

To those in the rock products industry who are interested in the setting phenomena of cement, plaster or lime, the chapter by Charles Saylor, on "Adsorption and Crystal Forms" (chapter III, pp. 49-54), will be found full of interesting and valuable information. The author points out the changes in form that crystals undergo when certain addition agents are added to the solutions or melts. To illustrate, he points out the fact that ordinary salt crystallizes from aqueous solutions in the form of perfect cubes, but in the presence of urea the crystals assume the shape of octahedra, or cubes with octahedron faces truncating the corners of the cube.

He explains this and similar examples of crystal growth by pointing out that, in the case of sodium chloride, the corners of the cube adsorb urea and give it a protective coating. Before crystal growth can proceed this blanket, so to speak, must be removed. In the event there are no means available for the crystal to remove this coating, the crystal then proceeds to grow on that portion of itself not protected.

With this line of reasoning as a basis, he shows that it is possible to predict the nature of the changes in the shape of a crystal, due to the addition of different salts, acids or bases, or combinations of these three addition agents. He produces stubby or long thin crystals from the same solution and explains that the change in shape is due to the primary crystal adsorbing the different addition agents in different manners. Where one or more addition agents are used, he points out that in some cases one agent neutralizes the other, in various degrees of magnitude, so that crystals of complicated structure are produced. The new technique is absolutely general and applies to melts as well as solutions.

Colloidal Ferric Hydrate in Molding Sands

In Chapter XXI, Clyde C. DeWitt and George Granger Brown, in their introductory matter, cite several authorities on the iron and iron hydroxide content of molding sands. Among those quoted was Boswell in *Engineering* (1916), who reports as follows:

"The chief natural bonds in molding sands are ferric hydroxide and clay substances (silicates of alumina, fine mica, etc.). These, like many of the artificial bonds in common use, are colloidal bodies. The adsorbative power of clay, in the matter of both gases and solutions, increases with the limonite content. . . . One of the most remarkable characteristics of a good molding sand is its extraordinary power to take up considerable quantities of water without becoming wet. Some of the sands hold as high as 13.5% water.

"Another important desideratum of good molding sands, possibly connected with the colloidal character of the bond, is that they should not 'go dead,' that is, dehydrate too readily after the metal has been cast in them. Iron oxide readily hydrates again, while clays become 'porcelainized' by the heat.

"The distribution of the bond in natural bonded sands is ideal. Each grain of quartz is coated with a thin pellicle of ferric hydroxide or ferruginous clay. Water skins cannot hold on to clean quartz, but each coated grain assumes the skin of water, which, with its neighbor, constitutes the enormously strong 'green bond' of the sand. In the case of sands from South Africa containing 4.81% of ferric hydroxide, the molds produced were of extraordinary strength and toughness."

The authors call attention to the fact that ordinary sand without bonding properties will show an iron oxide content of 5 to 6%, whereas in molding sands the iron oxide analysis may run from 5 to 6.5%.

It is also pointed out by the authors of this chapter that a sand high in iron or lime may have good bonding qualities, but these two ingredients act as fluxing agents and are therefore objectionable under certain conditions. They stress the point in this regard, that if the iron is distributed over the area of the sand particles then the small amount of iron in contact with each silica grain will be so small as to make the fluxing action practically nil. In this form the iron acts as a base to hold the clay more firmly to the smooth surface of the silica. They also call attention to the previous attempts that have been made to produce an artificial molding sand and suggest that the causes of these failures was the lack of knowledge of the action of colloidal iron hydroxide.

In the subject matter of the paper they describe methods developed to test various molding sands for permeability, bond strength and water content. They outline methods for determining the amount of colloidal iron and clay in molding sand and describe their methods of preparing iron-free base materials for synthetic molding sand experiments. Their synthetic molding sand was prepared by adding precipitated ferric hydroxide, that had been previously dialyzed, to specially prepared sand bases. In some instances clay was added in addition to the hydrate. The molding sands produced by the use of the three materials, pure sand, kaolin and iron hydroxide, were of exceptionally high quality.

They investigated the effect of the heat on the synthetic and natural sands and found that there was a decrease in the bond strength due to heating to 600 deg. F. and holding at that temperature for three hours or more. They found that the silica and iron content were not effected by the heat in a detrimental way. Likewise the kaolin content was not injured, but that the kaolin contained other minerals such as halloysite and allophane that were dehydrated irreversibly at that temperature.

The report clearly demonstrates the fact that it is possible to take ordinary beach sand and by the addition of kaolin and iron hydroxide make a high quality molding sand for most purposes.

The Determination of Minerals Under the Microscope

THE DETERMINATION OF MINERALS UNDER THE MICROSCOPE, by John W. Evans. Published by Thomas Murby & Co., 1, Fleet Lane, E. C. 4, London, and handled by D. Van Nostrand Co., 8 Warren Street, New York. 104 pages and 51 illustrations.

A BOOK on "The Determination of Minerals Under the Microscope," by John W. Evans, presents a revision and amplification of communications on the subject published in the Proceedings of the Geologist Association, 1909, Vol. XXI, pp. 79-94, and in the Journal of the Quekett Club, 1915, Vol. XII, pp. 597-630. The intention of the author is to provide a book for students' use in learning the use of the petrological microscope and in studying the optical properties of minerals with higher mathematics.

The first two chapters of the book describe the petrological and metallurgical microscope and the nature and properties of light. This is all preparatory to the more detailed discussion of the problems to be solved by the use of the microscope.

The investigation of the optical characteristics of a mineral in thin section is in effect a method to ascertain the size and form of the indicatrix and its orientation relatively to the crystal structure. The greater part of the book deals with the procedure necessary to determine these characteristics. This operation being classed under three main headings, (a) examination of the object image, including sketching the mineral and indicating its position at various angles, determination of position of cleavage, position of extinction, absorbtion of colors, character and direction of light vibrations and amount of relative retardation; (b) examination of the direct image, and (c) observations extending to other crystals of the same mineral, determination of rock slide thickness, a study of the interference figures of other sections of the same mineral, determination of the sign and the refractive index of the mineral.

For students or for those with a slight knowledge of crystallography this book can be recommended as the subject is well handled and a thorough working knowledge of the use and application of the microscope can be gained by a study of its content.

Report on the Bauxite Deposits of Mississippi

THE BAUXITE DEPOSITS OF MISSISSIPPI, by Paul Franklin Morse. Published by the Mississippi State Geological Survey as Bulletin No. 19. 208 pages, with maps and drawings.

REVIEWED BY DR. OLIVER BOWLES

BULLETIN 19, "The Bauxite Deposits of Mississippi," by Paul Franklin Morse, should be of considerable interest at this time to various groups of rock products producers. The report, published by the Mississippi State Geological Survey in 1923, describes all the known deposits of bauxite in the state in considerable detail. Prospects in 11 different counties are estimated to contain more than one million tons of low-grade bauxite, and more than half a million tons of higher grade material running 40 to 60 per cent Al_2O_3. The bulletin is of more than local interest, for it includes a general discussion of the properties of bauxite, and a description of foreign deposits as well as deposits in various parts of the United States. Methods of mining and treatment, and the uses of bauxite are also described. Various methods of bauxite analysis are given in an appendix. The book, consisting of 208 pages, contains many maps showing the locations of Mississippi deposits.

Bauxite is usually classed with the metallic ores because its chief utilization is for the manufacture of metallic aluminum. It is, however, of wide and increasing interest as a non-metallic, because it is used extensively for the manufacture of aluminum chemicals, abrasives and refractories. The successful use of high alumina cement in France, and its recent manufacture in America, further encourage the development of domestic ores, for the bauxite now used in high alumina cement manufacture is nearly all imported. High alumina cement consists of a mixture of bauxite and limestone fused in a blast furnace or in an electric furnace. Such cements have certain advantages over portland cement, the chief of which are greater resistance to chemical action, shorter setting time; the attainment of maximum strength in one or two days, whereas portland cement requires nearly a month. Detailed descriptions of the composition and properties of these new types of cements were given in ROCK PRODUCTS of Aug. 12, 1922, and May 30, 1925. High alumina cement under the name of "Lumnite" is now manufactured by the Atlas Lumnite Cement Co. at Northampton, Pa. As this type of cement gradually finds wider acceptance in America the demand for bauxite must grow. Hence an increasing interest in bauxite deposits is to be expected.

Known bauxite deposits in the United States are confined to the South in the states of Arkansas, Tennessee, Georgia, Alabama, and Mississippi. Many of the deposits are too impure for use as mined, and bauxite users are viewing with some apprehension the gradual depletion of the high grade ores. The conviction is gradually taking root that operators must soon resort to one of several alternatives, either importations must be increased, new deposits of high grade ores must be uncovered, or methods must be developed for removing impurities, and thus raising the grade of the abundant low grade ores. The latter alternative bears considerable promise, and the urgency of the demand for experimental work has led the Southern Station of the United States Bureau of Mines at Tuscaloosa, Ala., to undertake tests and studies having in view the development of successful methods of treating the low grade ores.

As a companion report to Bulletin 19, attention should be directed to a report prepared by E. F. Burchard in 1925 entitled, "Bauxite in Northeastern Mississippi," U. S. Geol. Surv. Bull. 750-G.

Geology for the Layman

THE STORY OF GEOLOGY, by Allan L. Benson. Published by the Cosmopolitan Book Corp., New York. 300 pages, 39 illustrations. Price, $5.00.

IN this book, Mr. Benson has undertaken to give a logical and readable picture of the earth and its geology. He says at the outset that the average man of today is too busy or too negligent to study "textbook geology" and that his purpose is to present a good workable knowledge of the science in a manner which will appeal to the man in the street. To do this he uses a free and easy style, which even borders on the flippant at times, but underneath this there is the sound background of fundamental knowledge of the subject, for Mr. Benson has been a student of the science for years.

This book should be of interest to readers of ROCK PRODUCTS because the field is so close to their own. Geology is the basis for the study of any form of mineral deposit, and yet many producers have given it no more than a passing thought, chiefly because they viewed it as unreadable theory. Mr. Benson's book is not a technical study and is not intended to be valuable in locating deposits or estimating quantities, but it does give the facts of geology in an interesting way, and it helps the man who wants to apply those facts to his own particular problems.

Treatise on Arc Welding

Arc Welding, the New Age in Iron and Steel. Anonymous. 160 pp., 200 illustrations. Published by the Lincoln Electric Co., Cleveland, Ohio. Price, $1.50.

"ARC WELDING, the New Age in Iron and Steel," is the name of a new 160-page text-book recently published by the Lincoln Electric Co., Cleveland, Ohio.

This book is devoted largely to the use of arc welding in general production manufacturing. The arc welder is a production tool and this book makes it very evident that a knowledge of arc welding principles must be a part of the equipment of every designer and manufacturer working in iron and steel. The book contains more than two hundred illustrations, chiefly of products of representative manufacturers which have been manufactured by arc welding. In addition there are numerous diagrams and charts showing welding speeds and costs.

The book points out that there are two main fields for production welding, arc welding in place of riveting and the substitution of arc-welded steel for cast iron.

The opening chapter of this treatise discuses steel and cast iron from both the standpoints of strength and economy. The addenda to Chapter I is a technical discussion of this subject with diagrams and references to recognized authorities.

The book should make a welcome and useful addition to the library of rock products manufacturers, for welding practice is increasing and becoming quite a general thing about the plants in the industry.

League of Nations Considers Portland Cement

Report of League's Economic Bureau Said to Justify Proposed American Tariff

By Francis Miltown

Paris Correspondent of the New York *Herald-Tribune*, published in the *Herald-Tribune*, October 13)

ONE OF THE WORLD'S basic industries is that of cement. Rapid changes have taken place since the war. Fifty-three nations have contributed data from intimate sources, from which the economic section of the League of Nations has compiled a report which shows, as no other document has ever shown, the important part played by cement in the economic and industrial world. These changes have a marked bearing on the state of the industry in the United States.

This report, among other things, shows that the proposed American tariff of 8 cents per 100 lb. is necessary if cement produced by cheap labor in certain European countries is not to affect seriously the American industry. Belgium produces cement as low as 47 cents the 100 kilos (220 lb.), and the government railways grant a freight reduction of 52% to tidewater to encourage exportation. Belgium exports the largest proportion of its production of any country in Europe. Its export to the United States is on a large scale.

World production has increased from the year before the war 78.5%, but even now but 76% of the productive capacity of the world's cement plants is being made use of.

Europe's production in this period has fallen off 6.8%, that of America and other producing countries outside Europe has increased. Furthermore, new countries have been brought into production on a comparatively large scale—Cuba, Ecuador, Peru, Venezuela, Siam, the Soudan and Mozambique. These local productions curtailed by just that extent nearly half a million tons in 1928, the annual report of exporting countries. Repercussion resulting from the war has increased output in many other countries where the industry was but nascent—Japan, Australia and British India.

Holland Not a Producer

Of European countries Holland alone possesses no important cement industry. Latterly a large enterprise has come into being at Maestricht, destined to aliment, at least in part, the country itself and the Dutch East Indies, which hitherto drew their supplies from Germany, Belgium and Japan.

Of the great producing countries only the United States (30,000,000 metric tons), Germany (6,000,000), Great Britain (4,500,000), France (5,000,000), Italy (2,000,000), Czechoslovakia (1,500,000), Canada (1,50,000), find their interior consumption approximating the volume of their output. As all these countries are also exporters (Germany and Belgium in a great volume) there is also an import of replacement cement.

World export in 1913 was approximately 4,500,000 metric tons; in 1927 6,000,000 tons. Europe's part in world exports of 1913 was 84%; in 1927 it had increased to 91%.

Germany imports very little as compared with her annual export of 1,176,739 tons, Belgium imports still less, Denmark, with a production of 642,634 tons and an annual export of 500,710 tons, imported but 1,842 tons in 1928. And of Denmark's exports Porto Rico takes 31,000 tons; the United States, 23,000; Colombia, 18,000; Venezuela, 13,000; Brazil, 69,000, and the Argentine, 42,000 tons. All of this from right in what might be called American trade territory. Costa Rica, Haiti and Ecuador (and even Panama to the extent of 9,000 tons) get theirs from Germany.

United States Ranks Fourth

The United States is Belgium's third largest customer. Moreover, the United States ranks fourth among the world's importing countries (390,000 metric tons) and ninth among exporting countries (141,000 tons, which is a drop of nearly 60% from the volume of exports in 1913).

Belgium sells cement to the Argentine to the extent of 152,000 metric tons per annum, while that from the United States only measures up to 8,000 tons. Brazil buys 55,000 tons from Belgium and 150,000 tons from Germany, as against 2,000 tons from the United States. Peru gets 36,000 tons from Germany and but 2,000 tons from the United States.

Such comparisons and computations as these should come as a surprise to those European economists who claim that the United States is gobbling up world markets.

What is still more surprising is that while the United States cement production has increased from 15,707,165 metric tons in 1913 to 30,011,000 in 1928, export figures have fallen from 682,128 tons to 140,645 tons during the same period. Our largest customer is Venezuela—for 20,000 tons—while Germany's share in the annual trade of that country was 54,000 tons and that of Denmark 13,000 tons.

Germany and Belgium in the interval have seen their production stagnate as to volume, that of Germany remaining stationary also as to the volume of exports, but that of Belgium having nearly doubled. In any case cement export from the United States has fallen sadly.

English Output Grows

Great Britain has increased her output 60% since 1913, has quadrupled her imports and, in the last year, increased her exports, previously stationary, by 40%.

France, once again as a result of post-war readjustments, has made a phenomenal progress. Cement production has increased from 1,500,000 tons to 5,000,000 tons. Exports have increased but little, but interior consumption has absorbed virtually 4,800,000 tons—four times the pre-war consumption, obviously arrived at as a result of the rebuilding of the war zone.

Of producing countries the first in rank are:

Country	Year	Metric tons
United States	1928	30,011,000
Germany	1928	7,570,000
France	1927	5,100,000
Great Britain	1927	4,950,000
Belgium-Luxembourg	1927	2,800,000
Italy	1927	2,558,000
Czechoslovakia	1927	1,500,000

The principal exporting countries are:

Country	Year	Metric tons
Belgium	1928	1,816,000
Germany	1928	1,061,000
Great Britain	1928	925,000
France	1928	640,000
Denmark	1928	501,000
Kingdom Serbes, C. and S.	1928	377,000
United States	1928	141,000

The principal importing countries are:

Country	Year	Metric tons
Holland	1928	892,000
Brazil	1928	456,000
Argentina	1928	401,000
United States	1928	390,000
Straits Settlements	1928	318,000
Great Britain	1928	281,000
Egypt	1928	251,000

Imports are relatively low among countries of great production, but the figures are impressive nevertheless—Great Britain imports a volume equal to 8% of her production; France, 4%. Exports from Great Britain equal 15% and from France 9.8%. The United States export is rather less than one-half of 1%. The world export trade has increased 32% since 1913, of which the great bulk is to be credited to European countries. That of the United States has shrunk to almost invisible proportions.

Interior consumption is as follows:

Country	Year	Metric tons
United States	1928	30,260,000
Germany	1928	6,127,000
France	1927	4,818,000
Great Britain	1927	4,607,000
Japan	1927	3,560,000
Italy	1927	2,570,000
Canada	1928	1,693,000

The price of artificial portland cement, reduced to American currency, varies from $2.32 per quintal (220 lb.) in Soviet Russia to 47 cents in Belgium, $1.33 in Great Britain, $1.08 in Germany, $1.29 in France. In Central Europe the price runs from 84 cents to $1.27.

The European industry is highly organized. Cartels, trusts, combinations, syndicates, division of territory, etc., all play their

part. Germany, with four associations or syndicates, appears to be the most highly organized, Belgium hardly less and a marked tendency of combination development is shown by the big industries of Great Britain. Switzerland has a close-knit cartel which cares for its cement industries.

There are various international accords or agreements as between manufacturers in Germany and Switzerland, Germany and Poland, Germany and Belgium—especially with reference to the division of the market in Holland. A consortium of German, Swedish, English and Belgian manufacturers, with an annual output of 50,000,000 bbl., was recently brought into being for the handling of the South American market. There exists as well an Austro-Hungarian accord. The tendency is toward the forming of still other and closer combinations and cartels.

Customs dues in Europe vary from the equivalent of 5½ cents per 100 kilos in Norway to 77 cents in the Kingdom of the Serbes, Croates and Slovenes. The product is duty free in Belgium, Denmark, Great Britain, Holland and Lithuania.

Interior rail or water freight concessions to tidewater are accorded manufacturers who export cement over seas in many European countries. These are virtual government subsidies to an industry. These concessions or discounts run from 10% in Czechoslovakia to 26% in Germany, 52% in Belgium and 62% in Hungary.

British to Mark Imported Cement

THE STANDING COMMITTEE appointed under the British merchandise marks act has just announced a recommendation for issuing of orders in council for the marking of imported portland cement with the country of origin. It is recommended that the marking be done by stamping, printing or affixing tags on the sack, bag, cask or other container of the cement. This marking recommendation only applies to cement when exposed for sale, and the committee does not suggest that cement should be marked on importation.

The commission stated that the order was mainly for protection of small dealers.

Federal Court Holds Bribery to Be Unfair Business Practice

THE PRACTICE COMMONLY known as commercial bribery has been held by a federal court to be an unfair method of competition for the first time on record, the Federal Trade Commission announced October 16. Affirmation of an order to stop use of alleged commercial bribery was made by the circuit court of appeals for the sixth circuit against the Grand Rapids Varnish Co., in a case in which the commission was supported by the industry, it was added in the announcement, which follows in full text.

The United States circuit court of appeals for the sixth circuit, Cincinnati, has entered a decree affirming an order of the commission against the Grand Rapids Varnish Co., Grand Rapids, Mich., prohibiting the practice commonly known as commercial bribery and requiring a compliance therewith. The varnish company consented to the entry of this decree.

This is the first instance on record in which a federal court has affirmed that commercial bribery is an unfair method of competition.

The court orders that the Grand Rapids Varnish Co. "do forthwith cease and desist from directly or indirectly secretly giving, or offering to give, employes of its customers or prospective customers, without the knowledge or consent of their employers, as an inducement to cause their employers to purchase or contract to purchase, from the respondent, varnish and kindred products, or to influence such employers to refrain from dealing, or contracting to deal, with competitors of respondent, without other consideration therefor, money or anything of value."

The attitude of the paint, varnish and lacquer industry toward this practice is indicated by resolutions adopted at a trade practice conference held in Atlantic City in August, 1928. The resolutions condemned commercial bribery and provided for throwing open all records of companies involved in bribery investigations without resort to legal process. The commission was urged to proceed without delay with all pending investigations and proceedings.

The Grand Rapids Varnish Co. denied the jurisdiction of the court, on the ground that the subject matter of the commission's order does not constitute an unfair method of competition. At the same time the American Paint and Varnish Manufacturers' Association and the National Association of Purchasing Agents procured permission from the court and filed a brief supporting the jurisdiction of the court and the commission.

Last October the varnish company filed in court a motion to dismiss the commission's application for enforcement mainly on the ground of lack of jurisdiction. The court denied the company's motion June 4, 1929.

Port Stockton Cement Co. Project

THE PORT STOCKTON CEMENT CO. will locate its plant in Stockton, Calif., even if unable to secure the site it desires from the city, according to information received by J. V. Mendenhall, chairman of the citizens' committee of the company, from Emory E. Smith, official of the concern, Mr. Mendenhall stated recently.

Sale of city land to the company is opposed by a referendum petition submitted to the county clerk by Charles M. Weber.

Accidents in Quarrying Industry Reduced During 1928

A TOTAL OF 119 EMPLOYES were killed and 10,568 injured in the quarrying industry of the United States during the calendar year 1928, according to a statistical survey made by the United States Bureau of Mines, Department of Commerce. The death rate for the industry was reduced 10% and the injury rate 20% below the 1927 level.

In the quarrying industry 89,667 men were employed by 1436 active operators. The number of men employed was 1850 less than in the preceding year. A total of 24,397,377 man-days of labor were performed. The fatality rate per thousand 300-day workers was 1.46, while the injury rate was 129.95.

The quarrying of limestone required the services of the largest group of workers, 37,830; cement rock quarries employed 22,315; granite, 11,314; marble, 6777; trap rock, 3908; sandstone and bluestone, 3849, and slate, 3674. The highest accident rates were in the trap rock group, in which 9 fatalities and 591 injuries occurred, the fatality and injury rates being 3.13 and 205.78 per thousand 300-day workers, respectively. In the large group of limestone workers, 60 men were killed and 5399 injured, the fatality and injury rates being 1.84 and 166.02. Of the cement rock workers, 25 were killed and 1161 injured, the fatality and injury rates being 1.05 and 48.76. At the marble quarries, 7 employes were killed and 718 injured, with fatality and injury rates of 1.08 and 110.38. In the sandstone and bluestone group, 3 men were killed and 473 injured, with fatality and injury rates of 1.02 and 160.50. In the slate group, 4 were killed and 513 injured, with fatality and injury rates of 1.24 and 158.87.

Of the 119 deaths in the entire industry, 77 occurred in the quarries and 42 outside, while 6297 injuries occurred in the quarries and 4271 on the outside.

The greatest single cause of death in and about the quarries was falls or slides of rock or overburden, which accounted for 29 fatalities. Falls of persons caused 11 fatalities; machinery, 10; explosives, 9; haulage, 8; electricity, 3; handling rock at face, 2; flying objects, 2; drilling and channeling, 2, and boiler and air-tank explosions, 1. The largest single cause of all classes of injuries in and about quarries was handling rock at the face, which accounted for 1400 accidents. In outside work, machinery was responsible for 9 fatal injuries, haulage and falls of persons for 8 each; burns for 6; electricity for 4; falling objects for 3; flying objects for 1, and other causes for 3.

The largest number of quarry employes was in Pennsylvania, with 15,291. Ohio with 6610, Indiana with 5311, California with 4896, New York with 4590 and Vermont with 4463 workers followed in order. The largest number of deaths, 19, and injuries, 1520, occurred in Pennsylvania.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Manufacture of Art Objects of Colored Cement

Part I—Mosaic Tile for Artistic Metal Frame Inserts

By George Rice
Palo Alto, Calif.

THE process of making color cement objects to use as inserts in the framework of metal garden furniture, and the metal architecture of parts of building structures, and numerous other places where metal and cement can be used together, has attained a high state of art within recent years. One popular and fashionable form of color cement insert for a metal architectual design is the glass mosaic tile.

The method of making these mosaic tiles and adjusting them in place in a metal garden tea table top, or in a metal chair back, or in the lid of a metal sea pirate chest which stands in the hall of the home as an antique novelty, or for some other purpose, consists first in casting the tile to conform to the shape of the opening or openings in the metal to receive the same. Assuming that a number of mosaic tiles are to be made about 12 in. square for use as inserts in a metal structure, the first step would consist in procuring ordinary portland cement and mixing it for casting the tiles. If mixed with water, neat cement a gray color will result, but it will lack strength. It will crack when dry. Therefore it is made into concrete by adding about twice as much fine, clean sand as there is cement.

For construction purposes some gravel would be added, but for common tile making the cement and sand mixture will be effective. By adding water make the cement and sand mix of a consistency that will permit pouring it into a mold.

Preparation of the Mold

To make a 12-in. square mosaic tile for use as an insert in a metal structure place a piece of common window glass about 14 in. square on a level surface and produce a design on this glass base with glass mosaics as shown in Fig. 1. Glass mosaics are nothing more than pieces of plain or colored glass that can be obtained cheap or at no cost in the broken glass piles of any stained glass works.

Many of the fragments will be picked up the right size and ready to use, while other pieces will have to be shaped by breaking or

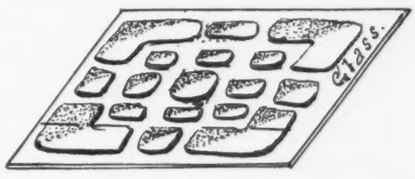


Fig. 1. Pieces of stained glass are cut to form a pattern and then glued to a surface

by cutting with a glass cutter. When the pieces of glass are in place on the base glass surface, the side or retaining bars are set up about the design as shown in Fig. 2. These

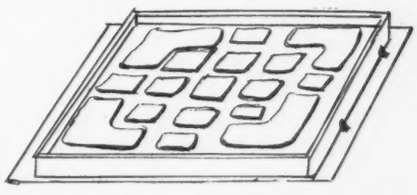


Fig. 2. The surface is placed on a mold and color cement poured over it

bars are wood, thick enough not to spring, and high enough to hold the cement in place which will be poured in to make the tile. The bars can be held in place with putty or clay or nailed at the corners. Grease the bars to prevent the cement from sticking. The cement can be colored before pouring it if it is desired to have this part a certain shade. Colors for cement are limited because those of a mineral source only can be used, as the colors of a vegetable or chemical source are destroyed by the lime action of the cement.

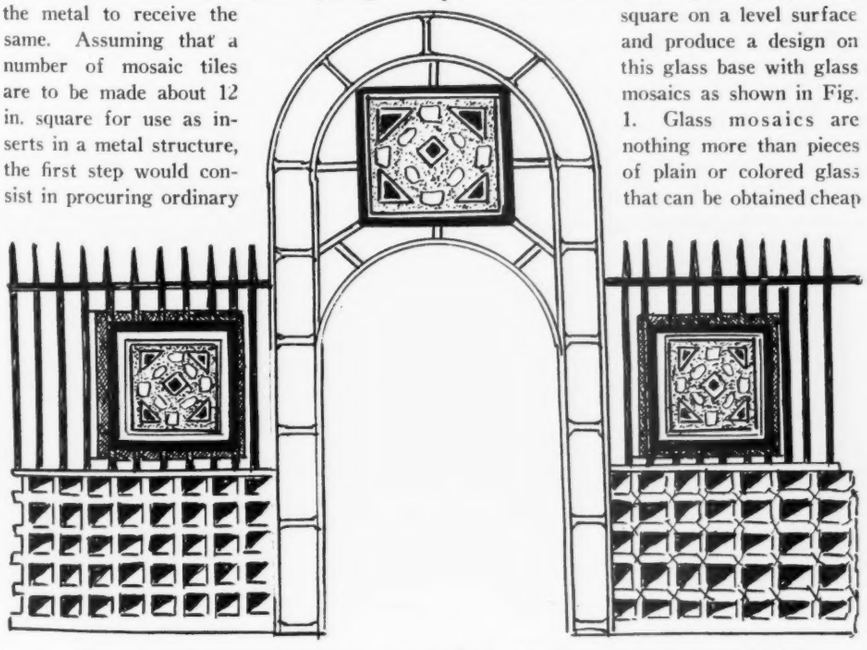


Fig. 4. An iron garden fence ornamented with color cement mosaic tiles

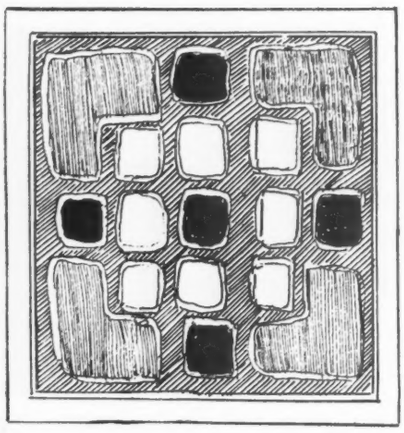


Fig. 3. Completed mosaic tile ready to be used as an insert

However, there are burned umber, yellow ochre, carbon black, mineral orange, indian red, ultramarine blue and a number of similar mineral colors which can be safely used and mixed so as to obtain almost nay desired tint or hue.

A color company in Ohio is now making mineral colors specially composed for cement work. But often the cement is used in its natural state, so far as color is concerned. The cement in either case is poured into the mold until the glass mosaics are covered and is allowed to stand until set hard enough for lifting out.

As the face of the glass mosaics have been in constant touch with the glass surface they will be free of any cement, and this side of the tile will be the front. Hence when taken from the mold the face or front of the tile will appear as shown in Fig. 3. A little rubbing with gasoline and a cloth will put on the necessary finishing touches and impart a gloss to the mosaics.

In Fig. 4 is shown some tile of this description used as inserts in an iron trellis structure in a garden. The same class of tile can be used in decorating iron, steel, brass, bronze or other metal bodies.

Sometimes the tiles are simply bolted to their positions instead of being mortised into the metal body. Then, again, in cases like that shown in this illustration, the tiles are not only set completely in the metal structure but they are cast with a double face, so that the glass mosaic design will show on both sides.

(To be continued)

Products Manufacture in England

IN FIVE years the Bates Concrete Manufacturing Co., Ltd., Camberley, England, has developed from a single hand-operated machine concrete products operation to the point where over 4000 concrete slabs are produced daily on an automatic power-driven multiple-slab press. In addition the company produces many other products which it distributes over a wide area.

The principal product, concrete slabs, is made in dimensions of 18x9x4-in.; coke breeze is used for aggregate. All the equipment is housed in a frame building with corrugated iron exteriors. The accompanying sketch shows the relative positions of the equipment and other operation details.

The breeze is unloaded on to the floor and fed by hand to the bucket elevator (*a*). This elevator feeds on to a screen (*b*), to remove the dust before the breeze reaches the first crusher (*c*). This crusher reduces the material to 1-in. down, and when it leaves the rolls it drops on to a shaker screen (*d*) which again eliminates the dust, the oversize going to the second crusher (*e*), which reduces the breeze to ½-in., and from here it passes to the boot of the bucket elevator (*f*) which delivers to the hopper (*g*) above the mixer.

The mixer (*h*) is of the tilting-drum type and is fed through the measuring-box (*i*), a simple device for controlling the batch when the mixer is charged from overhead. The inclined trough is connected to the bottom of the hopper, with a gate at the junction so that if desired the supply can be stopped at this point. A frame over the trough carries a pair of gates so arranged that the movement of a lever raises one gate while it lowers the other. The space between the two gates is of the correct size to hold one mixer-batch of aggregate.

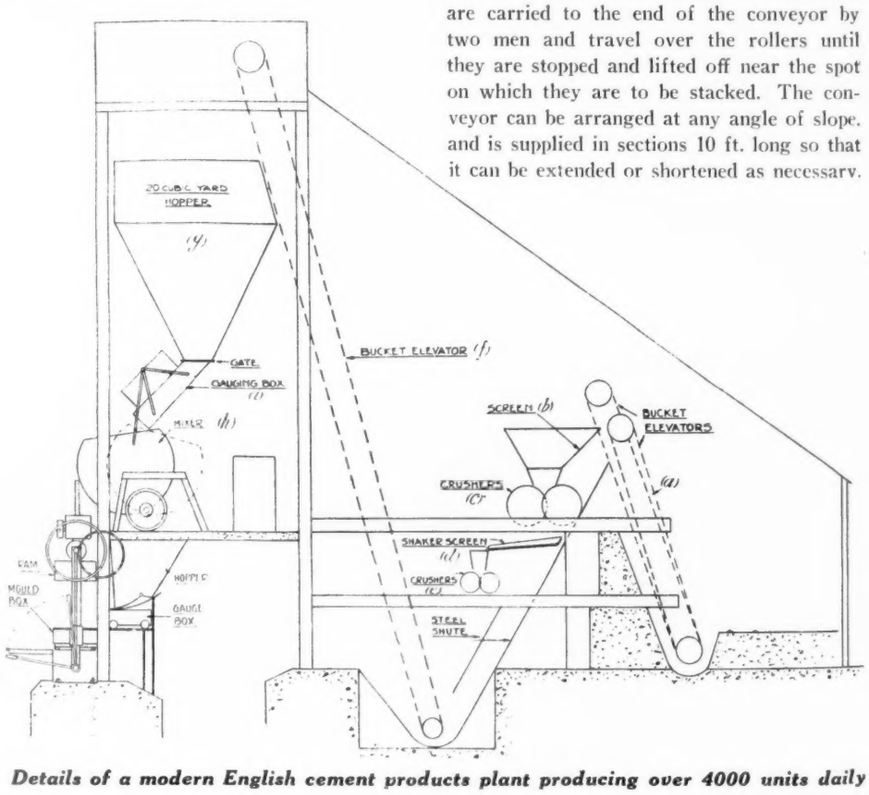
In operation, the sliding gate at the hopper mouth is opened while the lower trough-gate is closed. This allows the trough to fill, so that when it is desired to charge the mixer it is only necessary to push over the lever to raise the lower gate and allow the contents of the trough to fall into the drum; it will be noted that the same operation that opens the lower gate closes the top one, thus preventing the flow of materials from the hopper until the measuring trough is empty and the lower gate closed again.

Cement is measured separately and added from the stock carried in bags near the mixer. The mixer discharges down a chute to the slab-making machine.

In this type of machine the mold (divided to make four slabs at one operation) travels backwards and forwards. When in the rear position the mold is directly beneath the measuring box, and is automatically filled. While coming forward the mold passes beneath a scraper, which screeds the concrete flush with the top of the mold. As soon as the mold comes to rest the movement of a lever allows the heavy tampers to drop into it, and if desired the blows can be repeated as often as desired.

The machine is operated by one man. In addition, two men are needed to carry away when the machine is working at maximum speed, i. e., 400 slabs an hour. A 1:6 mix of portland cement and breeze from the adjacent gasworks is used for the slabs.

The newly-pressed slabs are carried to the outside curing area by an inclined conveyor consisting of angle-iron sides between which are rollers projecting a little above the sides. The pallets containing four slabs are carried to the end of the conveyor by two men and travel over the rollers until they are stopped and lifted off near the spot on which they are to be stacked. The conveyor can be arranged at any angle of slope, and is supplied in sections 10 ft. long so that it can be extended or shortened as necessary.



Details of a modern English cement products plant producing over 4000 units daily

Due to its light construction it can be easily moved about.

In addition to the large business in breeze slabs the company produces a considerable amount of other concrete products, and in this connection is making fence posts of aluminous cement. The mix used for these posts is 1 part of aluminous cement to 9 parts of gravel graded from ⅜-in. down.

In the actual manufacture of these posts with aluminous cement it is found that ordinary wood molds can be filled and stripped twice and again filled each eight-hour day. —*Concrete Building* (England).

Elements of Concrete Making

A HANDY little booklet with the above title has been recently brought out by the Concrete Association of India, Bombay. It contains considerable condensed information on the types and characters of aggregates, data on grading to secure different results and various tables of recommended mixes for several classes of construction. The types of equipment to be used are illustrated and plans for building several of these, as sand washing troughs, mixing boxes, etc., are given. A brief tabulation of mistakes to be avoided is appended.

Cement and Cement Products Manufacture in 1927

THE biennial census of manufacture, 1927, cement and concrete products, has been recently released by the U. S. Department of Commerce. Preliminary reports for these industries were issued in November, 1928, and April 3, 1929, and published in Rock Products, December 8, 1928, and April 13, 1929. The present report is available from the U. S. Printing Office, Washington, D. C., at 5 cents per copy.

As to Admixtures in Concrete

(An Editorial in Railway Engineering and Maintenance)

FOUR or five years ago, anyone who discussed the use of admixtures in concrete with a representative of a cement manufacturer, received little encouragement. He was probably told that nothing would be gained by the introduction of admixtures that could not be accomplished by the expenditure of the same amount of money for additional portland cement. Such statements were the more convincing because some of the admixtures were being exploited under auspices that surrounded them with an air of secrecy. The idea of a mysterious compound, which was alleged to produce remarkable improvements in the quality of the concrete in some equally mysterious manner, was entertained with a great deal of skepticism by men with technical training, and it was only natural that they should place all admixtures in the same category.

This attitude has been subjected to a marked change. Of particular influence to this end, was the introduction of the high alumina cements with which it is possible to produce concrete of high early strength, a characteristic of great advantage in railway work under a variety of circumstances. As a consequence, these new cements gained an enviable popularity in an exceedingly short time.

It is obvious that this situation could not be ignored by the manufacturers of standard portland cement and it was not long before they took steps to point out that portland cement concretes proportioned for low water-cement ratios would develop much greater strength in a few days' time, than concrete of the conventional proportions. Such concrete would not have as great a strength in 24 hours as a concrete made with high alumina cements, but it would cost as much, in spite of the use of an exceedingly rich mix, owing to the much greater cost of special cements.

However, the efforts to meet the new competition did not stop there. Scientific investigations of the effect of admixtures have not only resulted in more definite knowledge of their properties, but have also convinced the portland cement manufacturers that some of them may be employed to their own advantage. So, while the portland cement industry has by no means ceased its efforts to demonstrate the economies in construction to be gained by the use of concrete of high strength, that is, high in their content of portland cement, certain of the companies are now calling specific attention to the high early strengths that may be secured in portland cement concretes by the addition of certain admixtures.

This change in attitude on the part of the portland cement industry, together with a growing knowledge of the effects of admixtures and their specific limitations, have done much to give some of these materials a stronger place in concrete practice. Their use will continue to increase so long as those who employ them understand the specific function which they perform and realize that they offer no panacea for the many ills that may befall a concrete structure by reason of unsound aggregates, improper proportioning or indifferent workmanship.

F. C. Hedrick Heads Florida Products Association

F. C. HEDRICK of the Jacksonville Concrete Products Co. was elected president of the Florida Concrete Products Association at a recent meeting in Orlando. J. R. Foster of the Ocala Brick and Tile Co. was chosen as vice-president and W. C. Snade of the Halifax Concrete Products Co., Daytona Beach, was named to serve as secretary and treasurer. The association is made up of representative manufacturers of concrete building units throughout the state.—*Jacksonville* (Fla.) *Times-Union.*

Wisconsin Products Association Plans for 1930 Convention

PLANS for the 1930 convention of the Wisconsin Concrete Products Association, to be held at the Hotel Plankinton, Milwaukee, January 29 and 30, have been practically completed. The convention program includes a number of reports by district representatives of the Association, followed by a round-table discussion. Interesting speakers have been secured who will address the gathering on vital business topics.

Last year concrete products manufacturers from seven states attended the Wisconsin convention, which had an attendance of over 275. The committee hopes that the attendance will be larger this year, and invites concrete products manufacturers all over the United States to make plans to attend.

Gear Manufacturer Builds Chicago Plant

GEARS AND FORGINGS, INC., Cleveland, Ohio, has acquired from the Austin Co. a new plant at 2108-20 North Natchez Avenue, Chicago, where the company will specialize in the production of

New gear plant at Chicago

maintenance gears and small run production. This is part of an expansion program since the company's inception in 1928, when it acquired the interests of the William Ganschow Co. of Chicago and Peoria, Ill., the Van Dorn and Dutton Co., and the Ohio Forge Co. of Cleveland, and the Fawcus Machine Co. of Pittsburgh and Ford City, Penn.

The new plant provides 40,000 sq. ft. of manufacturing space, and ultimately all of the company's Chicago operations will be concentrated here. An addition providing for about 8,000 sq. ft. of space is being contemplated. The Chicago branch office is now located at the new plant, and C. F. Goodke is Chicago district sales manager.

Inspected Electrical Appliances

THE NATIONAL BOARD of Fire Underwriters have published their semi-annual revised list of inspected electrical appliances under date of April, 1929.

The list includes appliances inspected for accident hazard, automotive appliances, burglary protective devices, fire protection and a list of gas and oil appliances. The principal office and testing station of the Underwriters Laboratories, Inc., 207 E. Ohio St., Chicago, Ill.

New York Trap Rock Co. to Rebuild Poughkeepsie Plant

THE PLANT and equipment of the New York Trap Rock Co. at Stoneco, near Poughkeepsie, N. Y., will be modernized at a cost of $1,000,000, it was said recently at the office of the chief engineer in Newburgh.

Actual construction has started in the erection of ten new buildings. The Burrell Engineering and Construction Co. of Chicago has been awarded the general contract.

A detailed description of the new plant was withheld until the work has progressed further. The old buildings will be dismantled, and modern machinery installed in the new buildings.

No radical changes are contemplated in the facilities for shipping, as the bulk of the shipping is done by water and principal markets for the product being in New York and New Jersey.—*Poughkeepsie* (N. Y.) *Eagle-News.*

Torrance, Calif., Cement Mill to Begin Construction Soon

OVER a million dollars in construction payrolls will be spent by the Paramount-Portland Cement Co. in South Torrance, Calif., as the result of the annexation election recently, when 169 voters of Torrance unanimously approved the annexation of approximately six acres of uninhabited land adjoining the Torrance property already already owned by the cement company, states the Torrance *Herald.* There were no votes cast opposed to the annexation.

Officials of the Paramount-Portland Cement Co. state that they will begin excavating for their plant as soon as legal formalities are completed and title to the site is delivered. It is expected that this will take about thirty days, so that early in October actual operations will begin.

The plant will cost $2,800,000, according to company executives, and over a million dollars of this amount will be spent for labor in constructing the mill.

National Company Dismantling Burned Bluffton Plant

FOLLOWING a decision not to rebuild its recently burned quarry plant at Bluffton, Ohio (ROCK PRODUCTS, October 12, 1929), the National Lime and Stone Co. now has a force of men at work, salvaging the quarry equipment which will be shipped to the company's other plants at Findlay and Arlington. The power shovel will be installed after removal at the Findlay quarry. Pumps operated to keep the Bluffton quarry dry will be stopped after removal of the equipment and the 27-acre pit allowed to fill.

Twenty employes of the Bluffton plant will be offered employment at the company's Marion plant, according to Frank McElroy, resident superintendent, who is to be transferred to head the latter plant. Coincident with details of the closing down of the Bluffton plant came the announcement that the company has recently purchased a new tract of land near the Findlay plant along the Nickel Plate railroad, where stone can be loaded directly into cars on the Nickel Plate and T. and A. C. tracks.—*Bluffton* (Ohio) *News.*

Penn-Dixie Plans Reopening Kingsport Mill in January

FULL-TIME operations will be resumed January 1, 1930, at the Kingsport, Tenn., plant of the Pennsylvania-Dixie Cement Corp., according to Blaine S. Smith, president. The Kingsport plant was closed down early this year. Several hundred men will be given employment when operations are resumed.

John A. Miller, chairman of the board; Mr. Smith and W. H. Klein, general manager of the Penn-Dixie company, were in Kingsport recently conferring with Felix Guenther, Jr., general superintendent of the local plant, and John B. Dennis and J. Fred Johnson of the Kingsport Improvement Corp. Plans for reconstruction work at the plant were fully considered. Mr. Smith made the following statement in regard to reopening the plant: "The end of the shutdown period at our plant in Kingsport is in sight. We will start at once on the first stage of our construction project which will eventually convert the plant to wet process manufacture. By doing the work in two stages it will be possible to start the plant by January 1."

This, he said, would enable the local concern to fill orders for this territory. By January 1 new machinery will have been installed in half the plant, he revealed, and work will begin with part old and part new machinery in use. A thirty-day shutdown will be necessary about May 1, next, he said, in order to connect the additional new machinery with that which will be installed by January 1.

Decision to reopen the cement plant was linked in some quarters today with the American-Cyanamid Corp.'s plan to erect a $25,000,000 manufacturing plant in Sullivan county.—*Johnson City* (Tenn.) *Chronicle.*

Florida Portland Makes Cement Shipment to Panama

THE first consignment of portland cement to be shipped by the Florida Portland Cement Co. to the Panama canal zone cleared Tampa recently on the freighter *Willow Park.* The freighter *Santa Tecla* also loaded cement for the West Indies.—*Tampa* (Fla.) *Times.*

Lone Star Resumes Operations at Virginia Mill

THE Lone Star Cement Co., of Virginia, which suspended operations last August 10 because of the reduced demand for domestic cement occasioned by the low prices of the foreign-made product, is now in operation again at its South Norfolk plant with nearly 200 employes. The output is running between 2500 and 3000 bbl. a day. At the time the plant closed down, its storage facilities were taxed to their capacity and further manufacture was deemed unwise.

The South Norfolk plant is now shipping cement to points in Virginia, North and South Carolina, West Virginia, Maryland, Delaware and the District of Columbia. It is running at about two-thirds of its capacity, and according to the present outlook, will continue to do so indefinitely—at least through the winter.—*Norfolk* (Va.) *Pilot.*

Universal Gypsum Advances F. P. Dougherty

ANNOUNCEMENT is made of the appointment of Frank P. Dougherty as central sales manager, Universal Gypsum and Lime Co., Chicago, succeeding Samuel P. Cross, who resigned to become sales manager of the Woodville Lime Products Co. of Toledo, Ohio. Mr. Dougherty has been long connected with the Universal company.

The Universal company has also made W. S. Brown sales manager of the Fort Dodge branch and in direct charge of sales in the Northwest territory, succeeding H. J. Osterlund, deceased. Mr. Brown formerly handled wallboard sales from Chicago.

To Build Crushing Plant Near Tulsa, Okla.

A NEW company, name unannounced, is reported to be planning the erection of a large crushing plant at Richard Spur, Okla. Parts of sections 25, 26 and 36 in Lake Township are said to have been leased for the quarry rights; these sections are part of the deposit worked by Dolese Bros. It is understood that the Standard Paving Co., Tulsa contractors, is the owner of the leases obtained.

It will be necessary to build about three miles of trackage to connect the quarry with the main line of the Rock Island railroad.—*Lawton* (Okla.) *Constitution.*

Worker Crushed to Death at Slag Plant

STEPHEN NAGLICH, 32 years old, died in the Jackson Park hospital of injuries suffered on October 19 when he was crushed between a crane and a loading platform in the yards of the Illinois Slag and Ballast Co., Chicago.—*Chicago* (Ill.) *Tribune.*

The Rock Products Market

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Asbury Park, Farmingdale, Spring Lake and Wayside, N. J.	.48	.48	1.15	1.25	1.40	.....
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.25	1.15	1.75	.....	1.75	1.75
Buffalo, N. Y.	1.00	1.05	1.05	.....	.....	.....
Erie, Penn.	.70	.90	1.30	1.30	.....	.....
Leeds Jct. and Scarboro, Me.	.....	.....	1.75	.....	1.25	1.00
Milton, N. H.	.....	.....	1.75	.....	1.25	1.00
Montoursville, Penn.	1.00	.75	.50	.40	.40	.40
Northern New Jersey	.50	.50	.....	1.25	1.25	.....
South Portland, Me.	.....	1.00	2.25	.....	.....	2.00
Washington, D. C.	.60	.60	1.20	1.20	1.00	1.00
Georgetown, D. C.	.55	.55	1.20	1.20	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.35	.15	.25	.35	.35	.40
Appleton, Minn.	.....	.50	1.25	.....	1.50	.....
Attica, Ind.			All sizes .75–.85			
Barton, Wis.	.....	.40s	.50s	.65s	.65s	.65s
Des Moines, Iowa	.60	.60	1.50	1.50	1.50	1.50
Eau Claire, Chippewa Falls, Wis.	.....	.40	.55	.95	.85	.....
Elkhart Lake and Glenbeulah, Wis.	.60	.30	.50	.50	.50	.50
Grand Rapids, Mich.	.....	.50	.60	.70	.70	.70
Hamilton, Ohio	.....	.85	.85	.....	.85	.....
Hersey, Mich.	.....	.50	.....	.60	.70	.70
Indianapolis, Ind.	.50– .75	.40– .60	.50– .75	.50– .75	.60– .85	.60– .85
Mankato, Minn. (h)	.55	.45	1.25	1.25	1.25	1.25
Mason City, Iowa	.50	.50	.85	1.25	1.25	1.25
Milwaukee, Wis.	.91	.91	1.06	1.06	1.06	1.06
Minneapolis, Minn. (g)	.35	.35	1.35	1.35	1.35	1.25
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Waukesha, Wis.	.....	.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	.50	1.10	1.10	1.25
SOUTHERN:						
Brewster, Fla.	.40	.40	.....	.....	.....	.....
Charleston, W. Va.	2.00	.....	2.00	2.00	2.00	2.00
Eustis, Fla.	.....	.50	.....	.....	.....	.....
Ft. Worth, Texas	.....	.75–1.00	.90–1.00	1.00–1.10	1.00–1.20	1.00–1.20
Gainesville, Texas	.....	.....	.....	.....	.55	.....
Knoxville, Tenn.	.75–1.00	.75–1.00	.....	.....	1.20	1.05
Roseland, La.	.30	.30	1.00	.80	.80	.80
WESTERN:						
Los Angeles, Calif.	.10– .40	.10– .40	.20– .90	.50– .90	.50– .90	.50– .90
Oregon City, Ore.			All grades range from 1.00 to 1.50 per cu. yd.			
Phoenix, Ariz. (k)	1.25*	1.15*	1.50*	1.15*	1.15*	1.00*
Pueblo, Colo.	.70	.60	.....	1.25	.....	1.15
Seattle, Wash.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*

*Cubic yd. ‡Delivered on job by truck. (g) Per yd., delivered by truck, ¼-in. down, 1.25; 2-in. and less, 2.40. (h) ¼- to ¾-in., 1.25. (k) 60-70% crusher boulders. (s) Plus 15c for winter loading.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.10	2.00	2.25	.....	.....	4.25	.....
Beach City, Ohio	1.75	1.75	.....	1.50	1.50	.....	.....
Cheshire, Mass.			Sand for soap, 7.00–8.00			6.00–8.00	.....
Eau Claire, Wis.	.....	.....	.....	.....	.....	2.50–3.00	.....
Elco, Ill.			Water floated silica, 92-99½% thru 325 mesh, 18.00–40.00 per ton				
Franklin, Penn.	.....	1.75	.....	1.75	.....	.....	.....
Kasota, Minn.	.....	.....	.....	.....	.....	.....	1.00
Klondike, Mo.	2.00	.....	.....	2.00	2.00	.....	.....
Montoursville, Penn.	.....	.....	.....	1.25–1.60	.....	.....	.....
New Lexington, Ohio	2.00	1.50	.....	.....	.....	.....	.....
Ohlton, Ohio	1.75	1.75	.....	2.00	1.75	1.75	.....
Ottawa, Ill.	1.25	1.25	1.25	1.25	1.25	3.50	3.00
Red Wing, Minn. (a)	.....	.....	.....	.....	1.50	3.00	1.50
San Francisco, Calif.[1]	3.50†	5.00†	3.50†	3.50–5.00†	3.50–5.00†	3.50–5.00†	.....
Silica, Mendota, Va.			Potters' flint, 8.00–14.00				

†Fresh water washed, steam dried. [1]Core, washed and dried, 2.50. (a) Filter sand. 3.00.

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio	.....	1.50
Eau Claire, Wis.	4.30	.60–1.00
Franklin, Penn.	.....	1.75
Ohlton, Ohio	1.75	1.75
Ottawa, Ill.	3.25	1.25
Red Wing, Minn.	.....	1.00
San Francisco, Calif.	3.50	3.50
Silica, Va.	.....	1.75

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Cheshire, Mass., in carload lots	5.00–7.00
Franklin, Penn.	2.25
Klondike, Mo.	2.00
Ohlton, Ohio	2.50
Ottawa, Ill.	1.25
Red Wing, Minn.	1.50
San Francisco, Calif.	4.00–5.00
Silica and Mendota, Va.	2.50–3.00

Bank Run Sand and Gravel

Prices given are per ton, f.o.b. producing plant or nearest shipping point.

City or shipping point	
Algonquin, Ill.¶ (2-in. and less)	.30
Appleton, Minn.†	.55
Burnside, Conn.†	.75*
Des Moines, Ia.¶ (1-in. and less)	.85
Fort Worth, Tex.¶ (2-in. and less)	.67– .75
Gainesville, Tex.¶ (1½-in. and less)	.55
Gary and Miller, Ind.†	1.15–1.40a
Grand Rapids, Mich.¶ (1-in. and less)	.50
Hamilton, Ohio¶ (1½-in. and less)	.70
Hersey, Mich.¶ (1-in. and less)	.50
Mankato, Minn.†	.70
Seattle, Wash.—Sand, 1/10-in. down, .25*; ¼-in. and less, same; gravel in sizes ranging from 2-in. and less to ½-in. and less	.25*
Winona, Minn.¶ (2-in. and less)	.60
York, Penn. Sand, ¼-in. and less, 1.00; 1/10-in. down	1.10

*Cubic yard. †Fine sand, 1/-10-in. down. (a) Cu. yd., delivered Chicago. ¶Gravel.

Current Price Quotations

ROCK PRODUCTS solicits volunteers to furnish accurate price quotations regularly. Price quotation blanks will be mailed, as heretofore, regularly every 6 weeks, with a return, stamped envelope. If you can't see the reason for this request, please read the discussion on the editorial page 85!—The Editor.

Portland Cement

	Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.78¾	3.45	.....
Atlanta, Ga. (1) (2)	.....	2.11	3.01¶
Baltimore, Md. (1)	.....	2.26	3.56¶
Birm., Ala. (1) (2)	.....	1.75	2.73¶
Boston, Mass.	.44½	‡1.78–1.88	3.27¶
Buffalo, N. Y.	.48¾	‡1.95–2.05	3.35¶
Butte, Mont.	.90¾	3.61	.....
Cedar Rapids, Ia.	.....	2.04	2.99f
Charleston, S. C. (2)	.....	2.40b	3.15¶
Cheyenne, Wyo.	.59	2.66	.....
Chicago, Ill.	.....	1.85	3.15¶
Cincinnati, Ohio	.....	1.92	3.22¶
Cleveland, Ohio	.....	1.94	3.24¶
Columbus, Ohio	.....	1.92	3.22¶
Dallas, Texas	.....	1.80	3.39¶
Davenport, Iowa	.....	2.04	.....
Dayton, Ohio	.....	1.94	3.24¶
Denver, Colo.	.63¾	2.55	.....
Des Moines, Iowa	.....	2.14	2.99f
Detroit, Mich.	.....	1.95	3.25¶
Duluth, Minn.	.....	1.84	.....
Houston, Texas	.....	1.90	3.63¶
Indianapolis, Ind.	.54¾	1.89	f2.84–3.19¶
Jack., Miss. (1) (2)	.....	2.19	3.09¶
Jacksonville, Fla. (1) (2)	.....	2.36	3.26¶
Jersey City, N.J. (1)	.....	2.23	3.43¶
Kansas City, Mo.	.45½	1.82	f2.87–3.22¶
Los Angeles, Calif.	.51½	1.82	.....
Louisville, Ky.	.55½	1.82	f2.92–3.22¶
Memphis, T'n. (1) (2)	.....	2.19	f2.69–3.09¶
Milwaukee, Wis.	.....	2.00	3.30
Minneapolis, Minn.	.....	2.02	.....
Montreal, Que.	.....	1.60	.....
New Orleans, La.	.45½	‡1.88	3.18¶
New York, N.Y. (1)	.43¾	2.23	3.33¶
Norfolk, Va.	.....	1.77	3.27¶
Oklahoma City, Okla.	.57¼	2.16	3.56¶
Omaha, Neb.	.54	2.01	3.49¶
Peoria, Ill.	.....	2.02	.....
Pittsburgh, Pa. (1)	.....	2.25	3.35¶
Philadelphia, Pa. (1)	.....	2.25	3.45¶
Phoenix, Ariz.	.....	3.51	.....
Portland, Ore.	.....	2.30	.....
Reno, Nev. (2)	.....	2.82	.....
Richmond, Va.	.....	1.90	3.40¶
Salt Lake City, Utah	.70¼	2.81	.....
San Francisco (1) (2)	.....	2.60	.....
Savannah, Ga. (2)	.....	2.36a	3.15¶
St. Louis, Mo.	.48¾	1.70	f2.65–3.00¶
St. Paul, Minn.	.....	2.02	.....
Seattle Wash.	.....	2.65j	k3.50†
Tampa, Fla. (1) (2)	.....	2.40	3.30¶
Toledo, Ohio	.....	2.03	3.33¶
Topeka, Kan.	.50¼	2.01	3.41¶
Tulsa, Okla.	.53¼	2.03	3.43¶
Wheeling, W.Va. (1)	.....	2.32	3.42
Winston-Salem, N. C.	.....	1.84	3.34¶
Mill prices f.o.b. in carload lots, without bags, to contractors.			
Albany, N. Y.	.....	2.15	.....
Bellingham, Wash.	.....	2.35†	.....
Buffington, Ind.	.....	1.60	.....
Chattanooga, Tenn.	.....	2.05	.....
Concrete, Wash.	.....	2.25	.....
Davenport, Calif.	.....	2.05	.....
Hannibal, Mo.	.....	1.90	.....
Hudson, N. Y.	.....	1.75	.....
Leeds, Ala.	.....	1.65	.....
Lime & Oswego, Ore.	.....	2.40	.....
Mildred, Kan.	.....	2.35	.....
Nazareth, Penn.	.....	2.15	.....
Northampton, Penn.	.....	1.75	.....
Richard City, Tenn.	.....	2.05	.....
Steelton, Minn.	.....	1.65	.....
Toledo, Ohio	.....	2.20	.....
Universal, Penn.	.....	1.60	.....

NOTE—Add 40c per bbl. for bags. †10c disc., 10 days. ‡10c disc., 15 days. (a) With bags, 11c refund for paid freight bill. (b) With bags, 15c bbl. refund for paid freight bill. (1) Includes cloth bags at 40c. (2) 10c cash disc., 10c dealer discount. (f) "Velo" cement, including cost of paper bag, 10c disc. 10 days. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c disc. 15 days. (j) 25c bbl. disc. 10 days. (k) "Velo" cement, add 20c per bbl. for paper bags.

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chazy, N. Y.	.75	1.75	1.60	1.30	1.30	1.30
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Farmington, Conn.		1.30	1.10	1.00	1.00	
Ft. Spring, W. Va.	.35	1.25	1.25	1.25	1.15	1.10
Munns, N. Y.	.75	1.15	1.15	1.00	1.00	
Prospect Jct., N. Y.	.80	1.15u	1.15u	1.15u	1.10v	
Rochester, N. Y.—Dolomite	1.50	1.50	1.50	1.50	1.50	1.50
St. Vincent de Paul, Que. (n)	.65	1.25	1.05	.95	.85	1.00
Shaw's Junction, Penn. (e)	.85	1.35–1.60	1.35	1.35	1.35	1.35
Syracuse, N. Y.	.50	1.00	1.00	1.00	1.00	1.00
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill.	1.85		1.85			
Davenport, Iowa (f)	1.00	1.50	1.50	1.30	1.30	1.40
Dubuque, Iowa	.95	1.10	1.10	1.10	1.00	
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05 1.70	1.05–1.70	
Greencastle, Ind.	1.25	1.10	1.10	1.10	1.10	1.10
Lannon, Wis.	.90	1.00	1.00	.90	.90	.90
McCook, Ill.	.75	.80	.80	.80	.80	.80
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	
Stone City, Iowa	.75		1.20	1.05	1.00	
Toronto, Canada	2.50	2.50	2.50	2.50	2.50	
Waukesha, Wis.		.90	.90	.90	.90	
Wisconsin points	.50		1.00	.90	.90	
Youngstown, Ohio	1.00	1.00	1.25	1.25	1.25	1.25
SOUTHERN:						
Cartersville, Ga.	1.00	1.65	1.65	1.35	1.15	1.15
Chico, Texas	.50	1.30	1.30	1.25	1.20	
Cutler, Fla.		.50– .75r		1.50–1.75r		1.10r
El Paso, Texas (r)	.75–1.00	1.00–1.25	1.00–1.25	1.00	1.00	1.00
Olive Hill, Ky.		1.00	1.00	.90	.90	.90
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.70
Blue Springs and Wymore, Neb. (t)	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.00	1.25	1.25	1.25	1.00	
Rock Hill, St. Louis, Mo.	1.45	1.45	1.45	1.45	1.45	1.45

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn. (q)	1.20	1.60	1.45	1.35		1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	
Chico, Texas	2.50	2.00	1.45	1.20	1.15	
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	2.50	2.00	1.55	1.25	1.25	1.25
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	
Northern New Jersey	1.35–1.40	2.10	1.80–1.90	1.40–1.50	1.40–1.50	
Richmond, Calif.	.75		1.00	1.00	1.00	
Toronto, Canada	4.70	5.80		4.05		
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Cayce, S. C.—Granite			1.75	1.60	1.60	
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.—Flint rock			2.25–2.50s			
Lithonia, Ga.—Granite	.50	1.75	1.60	1.35	1.25	
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	
Middlebrook, Mo.	3.00–3.50		2.00–2.25	2.00–2.25		1.25–3.00
Richmond, Calif.—Quartzite	.75		1.00	1.00	1.00	
Toccoa, Ga.—Granite	1.50		1.50	1.35	1.30	1.25

(b) To ⅛ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Price net after 10c cash discount deducted. (f) High calcite fluxing limestone, 92-98% CaCO, 1.75. (n) Ballast R. R., .90; run of crusher, 1.00. (q) Crusher run, 1.40; ¼-in. granolithic finish, 3.00. (r) Cubic yard. (s) 1-in. and less, per cubic yard. (t) Rip rap, 1.20-1.40 per ton. (u) Less 2%, 15 days. (v) Less 2%, 10 days.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern New Jersey	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Penn.	2.00	1.00		1.00			
Western Pennsylvania	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio		1.30*		1.45*	1.45*	1.45*	
Jackson, Ohio		1.05*	1.80*	1.45*	1.05*	1.30*	
Toledo, Ohio	1.50	1.10	1.25	1.25	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.45*	1.80*	1.45*	1.45*	1.45*	
Ensley and Alabama City, Ala.	2.05	.55	1.25	1.15	.90	.90	.80
Longdale, Roanoke, Ruesens, Va.	2.50	.75	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05	.55*		1.15*	.90*	.90*	

5c per ton discount on terms. †1¼ in. to ¾ in., $1.05; ⅝ in. to 10 mesh, $1.25*; ⅝ in. to 0 in., .90*; ¼ in. to 10 mesh, .80*.

Agricultural Limestone
(Pulverized)

Alton, Ill.—Analysis, 99% $CaCO_3$; .03% $MgCO_3$; 90% thru 100 mesh	5.00
Branchton, Penn.—100% thru 20 mesh, 60% thru 100 mesh, 45% thru 200 mesh	a5.00
Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh	1.50
Cartersville, Ga.—90% thru 100 mesh, 2.00; 50% thru 50 mesh	1.50
Cypress, Ill.—Analysis, 94-98% $CaCO_3$, 2% $MgCO_3$; 90% thru 100 mesh, 1.35; 50% thru 100 mesh, 1.15; 90% thru 50 mesh, 1.15; 50% thru 50 mesh, 1.05; 90% thru 4 mesh, 1.10; 50% thru 4 mesh	1.00
Joliet, Ill.—Analysis, 52% $CaCO_3$; 48% $MgCO_3$; 90% thru 100 mesh	3.50
Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, bags, 3.75; bulk	2.50
Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton	2.00
Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh	4.25
Olive Hill, Ky.—Analysis, $CaCO_3$ 94-98%; 90% thru 4 mesh	1.00
Sibley, Mich.—Analysis, 87.47% $CaCO_3$; 8.30% $MgCO_3$; 60% thru 100 mesh, bulk, per ton, 2.30; 100-lb. paper bags, f.o.b. Sibley, Mich., per ton	3.75

(a) Less 50c comm. to dealers per ton.

Agricultural Limestone
(Crushed)

Bedford, Ind.—Analysis, 98% $CaCO_3$; 1% $MgCO_3$; 90% thru 10 mesh	1.50
30% thru 100 mesh	1.50
Chico and Bridgeport, Tex. — Analysis, 95% $CaCO_3$; 1.3% $MgCO_3$; 90% thru 4 mesh	1.00–1.25
Charles-Town, W. Va.—Lime Marl—Analysis, 95% $CaCO_3$, 50% thru 100 mesh, bulk, 3.00; including burlap bags	4.50
Colton, Calif.—100% thru 16 mesh, bulk, 4.00; including sacks	5.00
Dubuque, Ia.—Analysis, 34.96% $CaCO_3$; 59.62% $MgCO_3$; 90% thru 4 mesh	.95
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh	1.00
Ft. Spring, W. Va. — Analysis, 90% $CaCO_3$; 3% $MgCO_3$; 50% thru 100 mesh	1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh, sacked	5.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio—90% thru 100 mesh	3.00
90% thru 50 mesh	2.00
90% thru 4 mesh	1.00
McCook and Gary, Ill.—Analysis, 63% $CaCO_3$, 37% $MgCO_3$; 90% thru 4 mesh	.90
Middlepoint, Bellevue, Bloomville, Kenton and Whitehouse, Ohio; Monroe, Mich.; Bluffton, Greencastle and Kokomo, Ind. —85% thru 10 mesh, 25% thru 100 mesh	1.50
Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh	1.15–1.70
Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
West Stockbridge, Mass.* — Analysis, 95% $CaCO_3$; 90% thru 100 mesh, bulk	3.50
100-lb. paper bags, 4.25; cloth	5.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh	2.10

*Less 25c cash 15 days.

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 5.10; bulk	3.50
Joliet, Ill.—Analysis, 52% $CaCO_3$; 48% $MgCO_3$; 95% thru 100 mesh; paper bags (bags extra)	3.50
Piqua, Ohio—99% thru 100 mesh, bulk, 3.50; in 80-lb. bags (f.o.b. Piqua)	5.00
Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk	2.25–3.50
Shaw's Junction, Penn.—Analysis, 91.55% $CaCO_3$; 96% $MgCO_3$; 70% thru 100 mesh, bulk	4.50
Waukesha, Wis.—90% thru 100 mesh, bulk	4.50

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	12.00	.....	.....	17.50	.....	2.00
Buffalo, N. Y.	.....	.....	.....	12.00	.....	.....	.....	.....
Lime Ridge, Penn.	10.00	10.00	10.00	.....	6.00	8.00	5.00	.....
CENTRAL:								
Afton, Mich.	.....	.....	.....	.....	.....	10.75	7.50	12.11
Carey, Ohio	9.50	6.50	6.50	.....	8.00	.....	8.00	1.50
Cold Springs, Ohio	.....	6.50	6.50	.....	.....	.....	8.00	.....
Gibsonburg & Whiterock, O.	9.50	.....	6.50	.....	8.00	10.00	8.00	.....
Huntington, Ind.	.....	6.50	6.50	.....	.....	.....	.....	.....
Marblehead, Ohio	.....	6.50	6.50	.....	.....	.....	7.00	1.50[8]
Scioto, Ohio	10.50	7.50	7.50	8.50	8.00	.62½	7.00	1.50
Sheboygan, Wis.	.....	10.50	10.50	10.50	.....	.....	9.50	2.00
Tiffin, Ohio	.....	.....	.....	.....	8.00	10.00	.....	.....
Wisconsin points	.....	11.50	.....	.....	.....	.....	9.50	.....
Woodville, Ohio[26]	9.50	6.50	6.50	10.50[24]	8.00	10.00[9]	8.00	1.40[8]
SOUTHERN:								
Keystone, Ala.	17.00	9.00	9.00	8.00–12.00	.....	.....	6.00[21]	1.35
Knoxville, Tenn.	.....	9.00	7.50	7.50	.....	.....	5.00[1]	1.25[2]
Ocala, Fla.	12.00	11.50	.....	.....	.....	.....	.....	1.40
WESTERN:								
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
San Francisco, Calif.	19.50	15.00	13.00	15.00–19.00	14.50[20]	.90[17]	14.50[19]	1.85[17]

[1]Also 6.00. [2]To 1.35. [8]Wooden, steel, 1.60. [9]80-lb. [17]Less credit for return of empties. [19]To mortar plant and large industrials, 13.00. [20]Also 13.00. [21]To 8.00. [24]Superfine, 99.25% thru 200 mesh. [26]General purpose hydrated lime in 10-lb. paper sacks, 12.50 per ton.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 200 mesh (94-96% thru 300 mesh), $7.00 per ton in paper bags.

Slate Granules

Esmont, Va.—Blue, $7.50 per ton.
Pen Argyl, Penn.—Blue-black, 6.50 per ton.
Granville, N. Y.—Red, green and black, $7.50 per ton.

Roofing Slate

Prices per square—Standard thickness.

City or shipping point:	3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Arvonia, Va.—Buckingham oxford grey	13.88	19.44	24.99	29.44	34.44	45.55
Bangor, Penn.—No. 1 clear	10.50–14.50	24.50	29.00	33.50	44.50	55.60
No. 1 ribbon	9.00–10.25	20.00	24.50	29.00	40.00	51.25
Gen. mediums	9.50–11.25	.....	.....	.....	.....	.....
No. 2 ribbon	6.75– 7.25	.....	.....	.....	.....	.....
No. 1 Albion clear	7.25–10.50	16.00	23.00	27.00	37.00	46.00
Albion mediums	8.00– 9.00	.....	.....	.....	.....	.....
Chapman Quarries, Penn.—No. 1	8.50–11.25	(Vari-tone, 12.00–13.00)				
Medium	7.75– 9.00	.....	.....	.....	.....	.....
Hard vein	.....	16.00	23.00	26.00	32.00	40.00
Granville, N. Y.—Sea green, weathering	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green and gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple and unfading green	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Monson, Maine	19.80	24.00	.....	.....	.....	.....
Pen Argyl, Penn.*						
Graduated slate (blue)	.....	16.00	23.00	27.00	37.00	46.00
Graduated slate (grey)	.....	18.00	25.00	29.00	39.00	48.00
Color-tone	11.50–12.50; Vari-tone, 12.00–13.00; Cathedral gray, 14.00–15.00					
No. 1 clear (smooth text)	7.25–10.50; No. 1 clear (rough text), 8.25–9.50					
Albion-Bangor medium	8.00–9.00; No. 2 clear, 8.00–9.00; No. 1 ribbon, 8.00–8.50					
Slatedale and Slatington, Penn.—						
Genuine Franklin	11.25	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1	10.50	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1 clear	9.50	18.00	22.00	26.00	36.00	46.00
Blue Mountain No. 2 clear	8.00	18.00	22.00	26.00	36.00	46.00

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.
*Unfading grey, 10.50–12.50; textural, 12.00–15.00; 10% disc. to roofer; 10%–8½% to wholesaler.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:	
Crude talc, per ton	5.00
Ground talc (20-50 mesh), bags	6.50
Ground talc (150-200 mesh), bags	9.00
Pencils and steel crayons, gross	1.50– 2.00
Chester, Vt.:	
Ground talc (97-99½% thru 200 mesh, paper or burlap bags, bags extra	7.50– 8.50
Same, including 50-lb. Kraft paper bags	8.50– 9.50
Same, including 50-lb. bags	9.00– 9.50
Clifton, Va.:	
Crude talc, per ton	4.00
Ground talc (150-200 mesh), in bags	12.00
Conowingo, Md.:	
Crude talc, bulk	4.00
Ground talc (150-200 mesh), in bags	14.00
Cubes, blanks, per lb.	.10
Emeryville, N. Y.:	
Ground talc (200 mesh), bags	13.75
Ground talc (325 mesh), bags	14.75
Hailesboro, N. Y.:	
Ground talc (300-350 mesh) in 200-lb. bags	15.50–20.00
Henry, Va.:	
Crude (mine run)	3.50– 4.50
Ground talc (150-200 mesh), bags	7.50–13.00
Joliet, Ill.:	
Ground talc (200 mesh) in bags:	
California white	30.00
Southern white	20.00
Illinois talc	10.00
Crude talc	3.75
Los Angeles, Calif.:	
Ground talc (150-200 mesh) in bags	15.00–24.00
Natural Bridge, N. Y.:	
Ground talc (300-325 mesh), bags	12.00–15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-68%	3.75– 4.25
Mt. Pleasant, Tenn.—B.P.L., 75%	6.50

Ground Rock (2000 lb.)

Gordonsburg, Tenn.—B.P.L. 65–70%	3.75– 4.50
Mt. Pleasant, Tenn.—Lime phosphate: B.P.L., 73%, 80% thru 300 mesh	11.80
Mt. Pleasant, Tenn.—B.P.L., 72%	5.00– 5.50

Florida Phosphate

(Raw Land Pebble)

(Per Ton)

Florida—F.o.b. mines, gross ton, 68/66%	
B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Pringle, S. D.—Mine run, per ton	125.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H.—Per ton,	
Mine run	300.00–360.00
Clean shop scrap	27.50–29.00
Mine scrap	22.50
Roofing mica	a37.50–40.00
Punch mica, per ton	200.00–240.00
Trimmed mica, per ton, 40 mesh, 42.50–45.00; 100 mesh, 60.00; 200 mesh	100.00
Trenton, N. J.—Mine scrap, per ton	20.00
Clean shop scrap, per ton	22.00

(a) Also 38.00–42.50 per ton.

Gypsum Products— CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ⅜x32x 36". Per M Sq. Ft.	½x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
Acme, Tex.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Blue Rapids, Kan.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Centerville, Iowa	.....	.....	6.00	7.00	.....	7.50	8 50	10.50a	.....	.....	.....	.....	.....
East St. Louis, Ill.—Special Gypsum Products—Partition section, 4 in. thick, 12 in. wide, and up to 10 ft. 3 in. long, 12c per ft., 21.00 per ton; outside wall section and interior bearing wall section, 6 in. wide, 6 in. thick, and up to 10 ft. 3 in. long, 25c per ft., 30.00 per ton; floor section, 7 in. thick, 16 in. wide, and up to 13 ft. 3 in. long, 17c per ft., 23.00 per ton.													
Ft. Dodge, Iowa; N. Holston, Va.; Akron, N. Y.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Grand Rapids, Mich.	.....	.....	7.00d	.....	8.00d	8.00d	19.85c	8.00d	29.25e	21.00d	.....	15.00	22.50
Los Angeles, Calif. (b)	.....	6.50–7.50	6.50–7.50	7.50–9.00	13.10–14.10	.....	14.10	.....	26.00	.....	.....	.....	.....
Medicine Lodge, Kan.	.....	.....	.....	.....	.....	.....	.....	.....	15.00y	.....	.....	.....	.....
Portland, Colo.	.....	7.00	7.00	9.00	9.00	9.50	9.00	.....	27.50	.....	22.50	27.50	.....
Providence, R. I. (x)	.....	.....	.....	12.00–13.00e	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seattle, Wash. (z)	6.00	9.00	9.00	13.00	.....	.....	14.00	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.00	.....	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00w	25.00g	33.00f

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (a) White molding. (b) Plasterboard, 18½c to 25c sq. yd. (c) Satin Spar, in paper bags. (d) Includes paper bags. (e) Includes jute sacks. (f) "Gyproc," ⅜ in. by 48 in. by 5 and 10 ft. long. (g) ⅜ in. by 48 in. by 3 to 4 ft. (w) 16x48. (x) "Fabricaste" gypsum blocks, 2- and 3-in., f.o.b. motor trucks at plants, 7¼c-8¼c. Block setting plaster, per ton, in jute sacks, 12.00. (y) Jute sacks, 18.00; paper sacks, 16.00. (z) Gypsum partition tile, 3-in., 9c per sq. ft.; 4-in., 11c per sq. ft.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt.—English pink, cream, and American Botticino, coral pink, pearl blush	¶12.50–‖14.50	¶12.50–‖14.50
Crown Point, N. Y.—Mica Spar		¶9.00–‖12.00
Easton, Penn.—Royal green	16.00–20.00a	
Middlebrook, Mo.—Red		20.00–25.00
Middlebury, Vt. — Middlebury white		‖9.00–¶10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		5.50
Phillipsburg, N. J.—Royal green granite		15.00–18.00
Randville, Mich.—Crystalite white marble, bulk	4.00	4.00– 7.00
Stockton, Calif.—"Nat-rock" roofing grits		12.00–20.00
Tuckahoe, N. Y.—Tuckahoe white	8.00	
Warren, N. H.		7.90– 8.40

¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb.

Soda Feldspar

DeKalb Jct., N. Y.—Color, white; pulverized, 200 mesh, in bags, per ton, 22.00, bulk 20.00; 140 mesh, in bags, ton, 20.00; bulk 18.00

Potash Feldspar

Auburn and Topsham, Me.—Color white, 98% thru 140-mesh 19.00

Bedford Hills, N. Y.—Color, white; analysis, K_2O, 12.26%; Na_2O, 2.86%; SiO_2, 66.05%; Fe_2O_3, .08%; Al_2O_3, 18.89%; pulverized 78% thru 100 mesh, bulk, 11.00–14.00; crude, bulk, per ton 9.00

Coatesville, Penn.—Color, white; analysis, K_2O, 12.30%; Na_2O, 2.86% SiO_2, 66.05%; Fe_2O_3, .08%; Al_2O_3, 18.89%; crude, per ton 8.00

Trenton, N. J.—White; analysis, K_2O, 13-14%; Na_2O, 2-2½%; SiO_2, 64-65%; Fe_2O_3, 0.07%; Al_2O_3, 18.50-19.25%; pulverized, 97% thru 325 mesh, crude, 8.50 per ton, ground 21.00

Rumney and Cardigan, N. H.—Color, white: analysis, K_2O, 9-12%; Na_2O, trace; SiO_2, 64-67%; Al_2O_3, 17-18%, crude, bulk 7.00– 7.50

Rumney Depot, N. H.—Color, white; analysis, K_2O, 8-13%; Na_2O, 1-1½%; SiO_2, 62-68%; Al_2O_3, 17-18%, crude, bulk 7.00– 7.50

Penland, N. C.—White; crude, bulk 8.00
Ground, bulk 16.50

Spruce Pine, N. C.—Color, white; analysis, K_2O, 10%; Na_2O, 3%; SiO_2, 68%; Fe_2O_3, 0.10%; Al_2O_3, 18%; 99½% thru 200 mesh; pulverized, bulk 18.00
(Bags 15c extra.)

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Dayton, Ohio	12.50–13.50
Detroit, Mich. (d)	e13.00–16.00*b
Farmington, Conn.	16.00
Grand Rapids, Mich.*	14.00–15.00
Jackson, Mich.	13.00
Lake Helen, Fla.	8.50– 9.00
Madison, Wis.	12.50a
Mishawaka, Ind.	11.00
Milwaukee, Wis.	13.00*
Minneapolis, Minn.	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	15.50
Portage, Wis.	15.00
Rochester, N. Y.	19.75
Saginaw, Mich.	13.50
San Antonio, Texas	12.50
Sebewaing, Mich.	12.50
South St. Paul, Minn.	9.00
Syracuse, N. Y.	18.00–20.00
Toronto, Canada (f)	g12.50–15.00c
Winnipeg, Canada	15.00

Delivered on job. (a) Less 50c disc. per M 10th of month. (b) 5% disc., 10th of month. (c) Delivered in city. (d) Also 15.50. (e) Also 14.00. (f) Also 14.00, f.o.b. city jobs. (g) F.o.b. yard.

Chicken Grits

Centerville, Iowa	9.25
Chico, Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per ton	10.00
Coatesville, Penn.—(Feldspar), per ton, in bags of 100 lb. each	8.00
Davenport, Ia.—(Limestone), bags, per ton	6.00
Los Angeles, Calif.—Per ton, including sacks: Gypsum	7.50– 9.50
Middlebury, Vt.—Per ton (a)	10.00
Randville, Mich.—(Marble), bulk	6.00
Seattle, Wash.—(Gypsum), bulk, ton	10.00
Waukesha, Wis.—(Limestone), per ton	8.00
West Stockbridge, Mass.	7.50– 9.00
Wisconsin Points—(Limestone), per ton	15.00

(a) F.o.b. Middlebury, Vt.

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	Size 8x8x16
Camden, N. J.	16.50
Chicago District	180.00–210.00a
8x10x16	230.00–260.00a
8x12x16	280.00–330.00a
Columbus, Ohio	13.00b– 15.00†
Forest Park, Ill.	21.00*
Grand Rapids, Mich.	11.00*
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12a

*Price per 100 at plant.
†Rock or panel face.
(a) Face. (b) Plain.

Cement Building Tile

Camden and Trenton, N. J.:	
3x8x16, per 100, 9.00; 3x9x16, per 100	9.00
4x8x16, per 100, 12.00; 4x9x16, per 100	13.00
6x8x16, per 100, 16.50; 6x9x16, per 100	15.50
Chicago District (Haydite):	
4x 8x16, per 100	13.00
8x 8x16, per 100	20.00
8x12x16, per 100	28.00
Columbus, Ohio:	
5x8x12, per 100	6.00
Grand Rapids, Mich.:	
5x8x12, per 100	6.00
Houston, Texas:	
5x8x12 (Lightweight), per M	80.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Camden & Trenton, N. J.	17.00	
Chicago District "Haydite"	14.00	
Columbus, Ohio	16.00	17.00
Ensley, Ala. ("Slagtex")	12.50	
Forest Park, Ill.		37.00
Milwaukee, Wis.	14.00	31.50
Omaha, Neb.	18.00	30.00– 40.00
Philadelphia, Penn.	15.50	
Portland, Ore.	12.00	22.50–55.00
Prairie du Chien, Wis.	14.00	22.00–25.00
Rapid City, S. D.	18.00	30.00– 40.00

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.:	
Red	15.00
Green	18.00
Cicero, Ill.—French and Spanish tile (red, orange, choc., yellow, tan, slate, gray) per sq., 9.50–10.00; green or blue, per sq.	11.50–12.00
Detroit, Mich.—5x8x12, per M	67.50
Houston, Texas—Roofing Tile, per sq.	25.0.
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00

Cement Drain Tile

Graettinger, Iowa.—Drain tile, per foot: 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in., 1.35; 36-in.	2.00
Tacoma, Wash.—Drain tile, per 100 ft.	
3-in.	4.00
4-in.	5.00
6-in.	7.50
8-in.	10.00

Annual Southwest Road Show and School

THE FIFTH annual Southwest road show and school is to be held at Wichita, Kans., February 25 to 28, 1930, according to F. G. Wieland, manager. The educational program will be arranged under the supervision of the Kansas State highway commission and the Kansas State Agricultural College in cooperation with the highway commissions of the southwest states, United States Bureau of Public Roads and several colleges and universities.

Arrangements are being completed for additional floor space to take care of the machinery, equipment, accessories, and material exhibits, which last year taxed the exhibit space to its limit.

Bonanza District, Colorado

THE GEOLOGICAL survey, department of the interior, in co-operation with the State of Colorado and the Colorado metal mining fund, has recently completed a detailed geologic survey of an area of about 30 square miles, covering the parts of the Bonanza district that have been most productive. A brief description of the rock formations and geologic structure, by W. S. Burbank, the geologist, is given.

Fullers Earth

Prices per ton in carloads, f.o.b. Florida shipping points.

16– 30 mesh	20.00
30– 60 mesh	22.00
60–100 mesh	18.00
100 mesh and finer	9.00

Note—Bags extra and returnable for full credit.

Stone-Tile Hollow Brick

Prices are net per thousand f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	29.00	42.50	53.00
Brownsville, Tex.		53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.		55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans, La.	35.00	45.00	60.00
Norfolk, Va.	35.00	50.00	65.00
Passaic, N. J.	35.00	50.00	65.00
Patchogue, N. Y.		60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% disc.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4 in.	6 in.	8-in.	10 in.	12 in.	15-in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Grand Rapids, Mich.(b)	.....	.....	.....	.60	.70	.90	1.20	.....	.....	1.80	2.10	2.35	3.50	4.00	5.60	6.90	7.85
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	1.70†	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Tiskilwa, Ill. (rein.)	.....	.....	.....	.75	.85	.95	1.20	1.60	.....	2.00	.....	2.75	3.40	.....	6.50	.....	10.00
Tacoma, Wash.	.15	.18	.22½	.30	.40	.55	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wahoo, Neb. (b)	.....	.....	.....	.....	.85½	.....	1.14	.....	.....	1.81	.....	2.47	3.42	4.13	5.63	6.49	7.31

(a) 24-in. lengths. (b) Reinforced. †21-in. diameter.

Texas Quarries, Inc., Not Affiliated with Indiana Limestone Co.

THE recently organized Texas Quarries, Inc., is not a subsidiary of the Indiana Limestone Co., as erroneously reported in ROCK PRODUCTS, October 12, 1929. The Indiana company has no interest in the Texas company nor do any of its officers, confining all its operations to Indiana and the promotion of Indiana limestone.

Plan Acquisition of Quarry Land for Park Purposes

THE Cleveland Stone Co. has given the town of Berea, Ohio, an option on 86 acres of quarry land, to be developed by the town for park purposes. The purchase price of $35,000 is less than the appraised value of $46,500 set upon the property by a committee of the Cleveland Real Estate Board. It is planned to develop the property as part of the Cleveland metropolitan park system, maintenance to be by the city of Cleveland, although title to remain in the town of Berea. —*Berea* (Ohio) *News.*

Two Minneapolis Workmen Killed in Contractor's Gravel Pit

WHILE 20 firemen, deputy sheriffs and workmen shoveled frantically for more than an hour to rescue them, two men were suffocated under a landslide that buried them in a sand and gravel pit at Seventy-second street and France avenue south, Minneapolis, Minn., October 22.

The victims were August Munson, 57 years old, a contractor and owner of the pit, and Edward Anderson, 48 years old, a workman.

The rescue party succeeded in uncovering Munson's head at a time when he was believed to be still alive, but before they could drag him out, another slide buried him again.

The fatality occurred near the end of the pit, whose sides rise nearly 70 ft. Munson and Anderson ventured into the place to shovel some sand out of a conveyor belt. As they were working the sand and gravel above gave way and tons of the loose material tumbled down upon them before they could escape.—*Minneapolis* (Minn.) *Tribune.*

"Had Your Lime Today" Never Meant for Fish

DEATH of 500 goldfish at the Wilson Seed and Floral Co., Columbus, Ohio, was attributed to an accidental overdose of lime in the purification process at the city waterworks by Chief Chemist Charles P. Hoover of the waterworks. More lime is used when the river is muddy, he explained, to which goldfish are especially susceptible. Human beings would not be affected by the lime, he said.—*Columbus* (Ohio) *Journal.*

A. S. T. M. Supplement

THE AMERICAN Society for Testing Materials has brought out the 1929 supplement to the 1927 edition of its triennial publication, "Book of A. S. T. M. Standards." The supplement contains 19 revised and 32 newly adopted standards, approved by letter ballot September 3, 1929. Those standards relating to metals and those relating to non-metallic materials appear in the one pamphlet, so the publication is thus supplementary to both Part I—Metals and Part II—Non-Metals of the 1927 Book of Standards. It is so arranged, however, that if anyone wishes to separate from the pamphlet those standards supplementing but one part of the Book of Standards, this separation can easily be accomplished. The price of the 293 p. pamphlet is $1.50.

Absolves Quarry Owners in Drowning Accidents

OWNERS of the abandoned quarries in northeast Minneapolis, Minn., in which several children have been drowned in the last few years, are not responsible under the law for deaths or accidents occurring about the old quarries, District Judge Gunnar H. Nordbye held recently, when he directed the jury in a suit against the Minneapolis Stone Co. to return a verdict for the defendant, Rudolph Ross, 1819 Lincoln street northeast, father of Hugo Ross, who was drowned in an abandoned quarry at Lincoln street and Sixteenth avenue northeast, in April, 1928, was the plaintiff.—*Minneapolis* (Minn.) *Evening Tribune.*

Broadcasting Kentucky's Mineral Resources

THOUSANDS of radio listeners listened to a recent interesting broadcast on the mineral resources of Kentucky from station WHAS. Dr. Henry A. Payne, consulting engineer of the American Mining Congress, was the speaker and he reviewed chiefly the occurrence and diversity of the non-metallic minerals of Kentucky, describing their preparation and uses. Fluospar, of which Kentucky mines 22% of the domestic output, and the rock phosphate beds are of increasing importance, Dr. Payne said.

Retail Prices of Various Rock Products Materials

THE TABLE below gives average prices paid September 1, 1929, by contractors for various rock products, delivered on the job at different principal cities of the United States. These prices were secured through the Bureau of Census.

AVERAGE RETAIL PRICES FOR ROCK PRODUCTS MATERIALS, SEPTEMBER 1, 1929

City	MATERIAL					
	Portland cement, per bbl, excl. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$3.10	.....	$21.50	$1.50	$2.25	.....
Waterbury, Conn.	3.00	$30.00	20.00	1.35	2.45	$18.00
New London, Conn.	3.00	25.00	26.00	1.50	3.00	18.00
New Bedford, Mass.	2.90	25.00	19.00	1.75	3.00	14.50
Haverhill, Mass.	2.80	27.50	20.00	2.00	.....	17.00
Poughkeepsie, N. Y.	2.28	22.00	24.00	2.50	3.50	18.00
Albany, N. Y.	2.97	24.75	18.00	.....	.....	15.30
Syracuse, N. Y.	3.15	22.50	24.00	2.35	1.80	18.00
Rochester, N. Y.	2.85	20.00	20.00	2.50	2.40	14.00
Buffalo, N. Y.	3.10	25.00	18.00	2.50	2.05	14.00
Paterson, N. J.	2.40	23.00	20.00	1.75	2.08	17.00
Trenton, N. J.	2.20	26.00	18.00	1.50	2.10	17.50
Scranton, Penn.	2.80	.....	18.00	3.25	.....	17.00
Philadelphia, Penn.	2.05	.....	15.50	1.85	2.45	19.75
Harrisburg, Penn.	2.55	.....	19.00	4.20	1.60	20.50
Baltimore, Md.	2.40	37.50	13.00	2.00	2.75	13.50
Washington, D. C.	2.55	25.00	14.00	.....	.....	16.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmount, W. Va.	2.90	35.00	17.00	3.25	3.40	18.00
Winston-Salem, N. C.	2.34	32.50	24.00	2.25	4.50	15.00
Columbia, S. C.	2.60	.....	18.00	1.25	3.00	17.00
Shreveport, La.	3.00	.....	22.50	2.00	4.00	24.40
Tampa, Fla.	2.40	.....	20.00	2.00	4.00	19.00
Birmingham, Ala.	2.60	.....	20.00	3.00	.....	16.00
Erie, Penn.	2.80	25.00	32.00	2.25	.....	19.00

City	MATERIAL					
	Portland cement, per bbl, excl. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
Canton, Ohio	$2.50	$33.00	$16.00	$2.50	$2.00	$15.00
Toledo, Ohio	.....	22.50	20.00	3.04	2.75	16.00
Columbus, Ohio	2.75	23.00	17.50	2.25	2.50	15.00
Cleveland, Ohio	2.56	22.00	16.00	2.63	2.65	12.50
Youngstown, Ohio	2.80	.....	18.00	2.75	2.75	15.00
Detroit, Mich.	2.60	24.60	14.80	2.75	3.00	18.00
Saginaw, Mich.	2.80	25.00	20.00	2.80	3.00	20.00
Terre Haute, Ind.	2.75	28.00	18.00	1.65	3.50	17.00
Rockford, Ill.	2.90	.....	16.25	1.75	2.40	16.00
Chicago, Ill.	1.95	.....	16.00	1.75	1.90	14.75
Milwaukee, Wis.	2.40	25.00	12.00	1.90	1.55	18.00
Lansing, Mich.	2.85	.....	22.00	2.25	2.25	16.50
Des Moines, Iowa	2.66	23.75	20.00	1.60	3.60	.....
St. Louis, Mo.	2.20	.....	18.00	2.70	1.90	16.00
Kansas City, Mo.	2.40	25.00	24.00	1.70	1.80	18.00
St. Paul, Minn.	2.60	25.00	21.00	1.40	2.00	16.00
Sioux Falls, S. Dak.	3.10	27.00	26.00	1.50	2.25	16.00
Grand Forks, N. D.	2.80	25.00	.....	2.60	.....	16.00
San Antonio, Tex.	2.82	37.00	20.00	2.10	2.35	17.90
Tucson, Ariz.	.....	.....	30.00	1.50	2.50	16.00
Los Angeles, Calif.	2.64	34.00	24.00	1.70	2.05	10.00
Long Beach, Calif.	2.46	32.50	25.00	1.60	2.30	14.00
San Francisco, Calif.	2.80	.....	22.50	1.40	1.25	20.00
Seattle, Wash.	2.65	32.50	22.00	1.65	.....	20.00
Portland, Ore.	2.60	27.50	25.00	2.00	1.60	19.00

The Selection and Application of Wire Rope Lubricant

By C. D. Meals
Chief Engineer, American Cable Co., New York

MOST users of wire rope are aware of the fact that, at the time the rope is fabricated, its core is impregnated with a chemically neutral lubricant. Unfortunately, however, it is not sufficiently appreciated that this initial lubrication of the core is not permanent; and that, if maximum life from a wire rope in service is to be obtained, the rope must be effectively lubricated at frequent intervals—this implying the use of a lubricant of the correct grade, properly applied.

In other words, though the "life" of a wire rope is influenced by such factors as method and materials of construction, manner of winding, intensity of the service, high temperatures, presence of water, acids or alkalies, the most important factor determining how long the rope will last is the degree to which it is protected by effective lubrication.

Some essential facts that should be known about the selection and application of lubricant to wire rope in order to obtain most effective lubrication are discussed below.

Why Lubrication Is Necessary

Wire rope cores are of two main types: (1) With a hemp center and (2) with a wire rope center. In the majority of cases, however, a core of hempen fibre is employed. Use of a lubricated hemp core in a wire rope serves two main purposes: It insures protection against rust and corrosion of the inner strands and the maintenance of adequate flexibility with a minimum of friction when the rope is first put into service, and preserves the fibres of the core.

It may be said that the life of a wire line is largely dependent upon the core. This is only another way of emphasizing the need for efficient lubrication; for, the purpose of the hempen core, in addition to the functions mentioned, is to provide a medium for the absorption of the lubricant and to cushion the interior faces of the strands. Consequently, when the core becomes dry and worn, the rope no longer receives adequate lubrication. Conversely, if a wire rope in service is not lubricated at frequent intervals, the core will become excessively dry and deteriorated—to the ultimate serious detriment to the rope.

Wear in any wire rope in active service can never be wholly eliminated; for it is impossible to prevent some friction to exist between individual strands of the rope, and between the sheaves or winding drums and the rope's exterior surface. But friction—and, therefore, wear and increased bending stresses—can be minimized by selecting a suitable rope lubricant and applying it properly; and deterioration caused by such factors as water, acids, alkalies, high temperatures or corrosive fumes can be materially lessened by the use of a lubricant possessing the qualifications essential for the particular conditions of rope use.

Lubrication Decreases Friction

When a rope is bent, friction develops between the inner strands. Consequently, the use of a lubricant is necessary to decrease this friction. Since bending tends to squeeze out lubricant from the core and inner surfaces of the rope, re-application of lubricant at regular intervals becomes necessary. By using sheaves or drums of large diameter the bending of a rope will not be so sharp and, therefore, less lubricant will be squeezed out. On the other hand, small sheaves necessitate the more frequent lubrication of the rope in order to keep wear to a minimum.

The life of the core depends largely upon its being lubricated at all times. Even an axial stress on the rope causes compression —of the core; in addition, there is the deterioration resulting from the crushing action that takes place when the steel strands press into the hempen core, as the rope is wound on and off the sheave or drum. Core wear is minimized by keeping it impregnated with lubricant at all times. A dry core not only will asborb moisture, but will also deteriorate and crush quicker than a well lubricated one —all of which affects the wearing qualities of the rope.

From the foregoing, it becomes evident that lubrication of a wire rope is necessary: (1) to retard rust and corrosion; (2) to reduce the internal friction between the individual inner strands; (3) to reduce the external wear by minimizing the friction between the outer surface of the rope and the drums or sheaves; (4) to retard the deterioration of the core by maintaining it in the proper state of softness and pliability.

The core on new wire rope retains quite a supply of the original lubricant but, as a further assurance that frictional wear and core deterioration will be kept at a minimum, lubricating the rope just after installation and before putting into service (particularly such ropes as have been kept in storage for some time) is recommended.

Selection of Lubricant

To get the longest service from a wire rope, the lubricant used thereon must be selected with the class of service in which the rope is used definitely in mind. In other words, a lubricant that will prove suitable on a slow speed derrick cable will not give equal satisfaction if applied to a high speed mine hoisting rope. However, there are several qualities that should be possessed by all wire-rope lubricants, regardless of rope service, namely: (1) ability to adhere firmly, at all times, under the heavy rubbing and scraping action of the wires; (2) ability to penetrate between the strands to the core and to impregnate the hemp center; (3) freedom from acids, alkalies or any other harmful ingredient that might pit or corrode the strands; (4) ability of the film of lubricant to spread itself; in other words, it must be flexible enough in its characteristics so that the rope can pass freely over the sheaves without danger of the lubricant either coming off or opening up to admit moisture; (5) preferably, should not evaporate or harden upon prolonged exposure to the air, nor be affected by moisture or corrosive fumes (if the latter are encountered in service).

Classification of Wire Rope

Wire ropes may be divided into five general classes as follows: (1) slow speed ropes operating under heavy loads; (2) high speed hoisting ropes; (3) haulage and slope ropes run at high speeds and under heavy loads; (4) general haulage ropes and ropes of lighter duty than those of Class 3; (5) stationary ropes exposed to moisture, corrosive fumes, or spray, etc. Each of the abovementioned classes demands certain particular qualifications in the lubricant used, which qualifications are not necessarily common to the other classes.

For slow speed ropes operating under heavy loads (Class 1), such as the ropes used on derricks, dredges, cranes, steam shovels, etc., a lubricant of heavy body and of adequate adhesive characteristics, applied cold, will give satisfactory results. A straight petroleum product having a viscosity of 900 to 1100 sec. at 210 deg. F., applied hot, will also prove suitable.

For high speed hoisting ropes (Class 2), such as mine shaft ropes, it is advisable to

use a lubricant of relatively low viscosity, possessing great penetrative and adhering qualities, and capable of saturating the rope thoroughly. Where automatic cable lubricating devices are utilized for applying lubricant to such cables, a light lubricant with a viscosity of 350 to 500 sec. at 100 deg. F. will prove satisfactory. Where application with a brush is required, a lighter lubricant should be used.

For furnace hoists, derrick falls, logging ropes, coal mine slope and shaft ropes, and haulage ropes and other ropes (running at high speeds and under heavy loads(Class 3) a mineral oil lubricant having a viscosity of 500 to 800 sec. at 210 deg. F. is recommended.

For general haulage ropes and for ropes of lighter duty than those of Class 3, it is advisable to use a mineral oil of a lower viscosity (for example, 200 to 300 sec. at 210 deg. F.) than that recommended for lubricating the rope in Class 3 service. However, there should be no lessening in the adhering, penetrating or lubricating qualities of the lubricant.

For stationary ropes exposed to moisture, corrosive fumes or spray, etc., either a grease or an oil can be used with equal satisfaction, provided the lubricant adheres to the rope under all conditions of service and forms a suitable protective coating. A straight petroleum product with a viscosity of 900 to 1100 sec. at 210 deg. F. (previously mentioned as being suitable for lubricating the ropes in Class 1 service) will meet this requirement.

The following general comments are applicable to the selection of a wire-rope lubricant:

The lubricant should be a fluid enough to penetrate the strands and the core, but not so fluid as to run off the rope nor so viscous as merely to cover the rope.

Tar products are not absolutely waterproof, are deficient in lubricating qualities, and, in addition, usually contain tarry acids which tend to corrode the rope—especially in the presence of moisture. Further, such products, on exposure to the air, eventually harden, crack and peel off the wire strands.

Soap-thickened mineral oils (that is, greases), while they can be made to the same consistency as the average straight mineral wire-rope lubricant, are usually deficient in adhering and penetrating qualities.

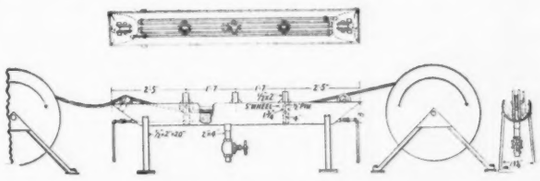
The greater the speed of a rope in service, the lower should be the viscosity of the lubricant used on the rope.

Wherever possible, it is best to utilize a thicker, semi-plastic lubricant and to apply it hot in a thinned condition, rather than to apply cold a more fluid lubricant. Where field conditions are such that cold application only is practical, then a chemically neutral rope lubricant should be used. Crude oil, since, in most cases, is chemically injurious to the core and steel in the rope, should not be used.

Where the rope must function under excessive abrasive conditions, such as in sand and gravel quarries, select a lubricant having high surface-protective ability in addition to lubricating, adhering and penetrating qualities.

Application of Lubricant

Selecting a wire-rope lubricant with care means little, unless the lubricant chosen be judiciously applied. As previously mentioned, applying the lubricant hot is recommended practice; for, thereby, the compound will penetrate and then cool to a plastic filler, thus preventing the entrance of water and serving to preserve and to lubricate the inner wires and core. This can best be done by slowly passing the rope through a heated bath of the oil.



Simple tank-type lubricator for wire rope

Another method, though less satisfactory (being wasteful of lubricant and therefore recommended only when conditions are such that immersion is impractible) consists in placing a drum of the lubricant, warmed by a steam-heating coil within the drum, above the rope and then allowing the lubricant to run out on to the rope through a suitable outlet valve. A brush for spreading should be placed, with bristles up, below the flow of lubricant and in adjustable contact with the rope.

Under no conditions is hand application of lubricant to wire rope entirely satisfactory, but it is better than no lubrication at all. In applying lubricant by hand, several methods are in use and best results are obtained if a piece of sheepskin, wool side turned in, is employed; otherwise, a bunch of waste. These methods are feasible only when the rope can be sufficiently slowed down.

In the case of vertical and inclined ropes, lubrication can be accomplished by permitting the rope to move slowly through lubricant-soaked waste or sheepskin, which can be either held in the hands of the workmen or bound in place.

With horizontal ropes, in slow motion, the lubricant can be poured with a dipper over the rope, catching the excess in a bucket beneath, and "working in" with sheepskin or waste placed back of the point where the lubricant is poured on. Another method consists in having the rope pass through a V-shaped wooden trough located on the ground, pouring the hot lubricant on the rope, and wiping off the excess with a bunch of waste held near the front of the trough.

Hand application of lubricant to wire rope at best is a messy job, and if there is much rope to be lubricated or lubrication at frequent intervals is necessary, it is advisable to use special appliances (which can be readily made), whereby messiness and waste of lubricant will be eliminated. In designing such devices, it should be borne in mind that, if at all possible, it is more practical and economical to lubricate a rope without removing it from service. The accompanying illustration shows how such devices may be built.

Frequency of Lubrication

Although all wire ropes, unless otherwise specified, are lubricated and impregnated in the manufacturing process with a compound that will protect the rope both internally and externally to a maximum degree and will minimize rust or corrosion until the rope is put into service, attention is again called to the fact that this initial lubrication is not permanent; therefore, the rope should be lubricated after installation and before being used—more especially so if it has been in storage for a year or more.

Thereafter, the frequency of lubrication will depend upon service conditions. So long as the rope is pliable and shows evidence of lubricant in the crevices between strands, it does not require such frequent lubrication. In general, the heavier the duty, the higher the operating speeds, the greater the number of small bends, or the more deteriorating the atmospheric or fluid conditions, the more frequently should lubricant be applied.

A wire rope that is to be taken out of service and stored should be well lubricated, and the outer surfaces given a thorough protective coating, before being put away.

Two Manufacturers of Lime Plant Equipment Consolidate

THE recently organized Lime and Hydrate Plants, Inc., York, Penn. (See ROCK PRODUCTS, September 28), has been merged with H. Miscampbell Co. of Duluth, Minn., the consolidation to carry the name of the latter company. W. J. Kuntz, becomes the vice-president in charge of sales of the new organization.

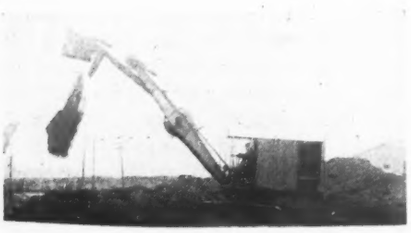
The Miscampbell company has made some improvements on its Clyde hydrator and plans to introduce soon a new type of vertical shaft kiln. Quite recently it made a shipment of hydrating equipment to the Mount Frome Lime Co., Sydney, Australia, and the Miscampbell engineers, under the direction of Mr. Kuntz, are now engaged in modernizing a battery of lime kilns for the Moosehorn Lime Co., Moosehorn, Man.

The Miscampbell company's main office will continue to be in Duluth with a branch office at 2 East Market street, York, Penn.

New Machinery and Equipment

New 3/4 Cu. Yd. Shovel

THE Lorain-45, a new ¾-cu. yd. capacity shovel, crane, clamshell and dragline, is announced by the Thew Shovel Co., Lorain, Ohio, supplementing its present line of product, the 1-cu. yd. Lorain-55 and the 1¼-cu. yd. Lorain-75. The basic design and construction principles of the Lorain-55 and Lorain-75 units are reflected in the new



Convertible 3/4-cu. yd. gasoline shovel

Lorain-45, which is built to the Thew center drive design in turntable, truck and shovel boom.

The superstructure or turntable is powered by a Waukesha Type H. S. motor with 5½-in. bore, 6½-in. stroke, developing 71 h. p. at 1000 r. p. m. Power transmission consists of a power take and a silent chain drive carrying the power directly to the center drive pinion.

Crawler high travel speed is said to be 1½ m. p. h., climbing a 15% grade and low speed, ¾ m. p. h., climbing a 30% grade. Both speeds are available for travel in either direction. A full range of boom equipment for shovel, crane, clamshell and dragline units is furnished for the Lorain-45.

The crane, clamshell and dragline booms are all-steel latticed booms, built in two sections, with interchangeable boom heads. The standard boom is 35 ft. long, although various lengths of boom head sections and middle sections can be furnished.

New Heavy-Duty Gasoline Engines in Small Sizes

TO MEET the growing demand for heavy-duty power in the lower horsepower ranges, the Hercules Motor Corp., Canton, Ohio, has developed the "OO" Series of four-cylinder engines. Built in three models, the new engines embody the characteristics of the Hercules "OX" Series engines, of which they are smaller counterparts.

The "OOA," "OOB" and "OOC" models, which comprise the "OO" Series, have bores of 3½-, 3¾- and 4-in., respectively, and a common stroke of 4½-in. They are identical in general design and the majority of the parts are interchangeable among the different models, the only difference being in the bore sizes and the parts affected thereby. All the models develop maximum torque at 1000 r. p. m. and peak at 2200 r. p. m.

Special consideration has been given to valve cooling, the valves being completely surrounded by water. As a further aid to valve cooling, the valve guides are brought up very close to the valve heads, to more quickly dissipate the heat absorbed in the heads.

Lubrication is full force feed from a pump located beneath the center main bearing and driven from the camshaft by spiral gears. Oil pressure can be adjusted to suit operation requirements.

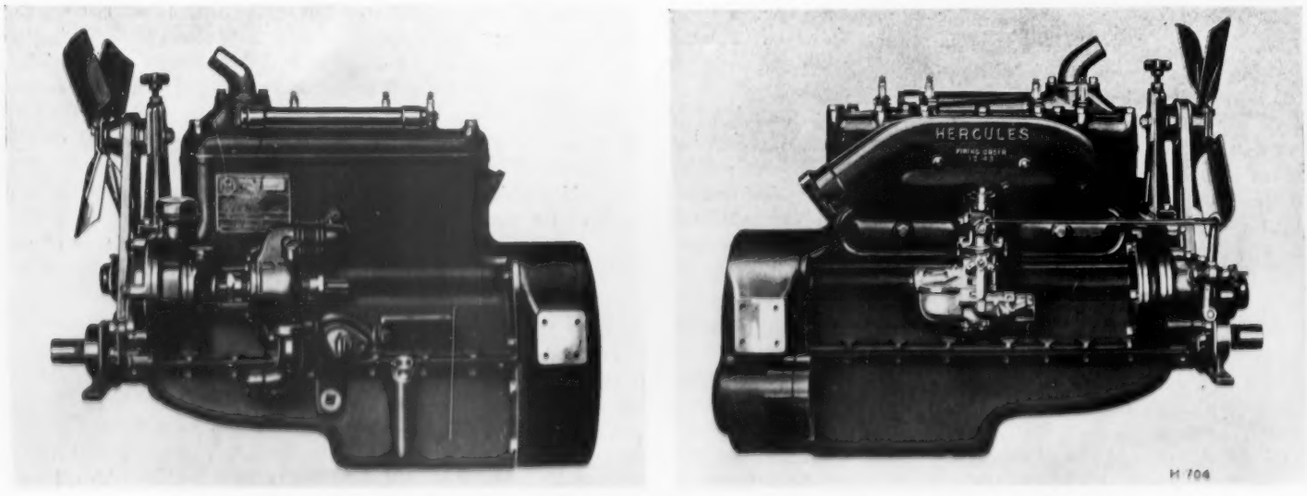
As in all Hercules engines, the "OO" Series models have the crankcase cast integral with the block. The pistons are of cast iron and carry three rings above the pin. The lower of these rings is an oil regulating type. Piston pins are of nickel molybdenum steel and are 1 in. in diameter. Connecting rods are of the "H" section shape and have a c. to c. length of 8 in.

The engines are of L head arrangement and the valves are the usual 45 deg. set type. The exhaust valves have a clear diameter of 1⅜ in. and the intakes of 1½ in. They are operated by mushroom type tappets.

Provision has been included for a wide choice of accessories, such as battery ignition by distributor, while any standard S. A. E. size magneto can be driven from the rear of the water pump shaft. There is an opening for attaching a pipe for thermo-syphon cooling.

The front support of the engine, furnished by a bracket, can be supplied for either three or four point suspension. Provision is also made for mounting a speed governor.

Either a No. 4 or No. 5 S. A. E. flywheel housing is supplied. Provision for mounting an electric starter is made in these housings. A flywheel with teeth cut directly into the rim of the wheel itself is used when a self-starter is desired. The manifold can be arranged to take either a 1 in. or 1¼ in. S. A. E. size carburetor.



New heavy-duty gasoline engine as seen from the accessories side (left) and manifold side (right)

New Oil Engine for Crane and Shovel Service

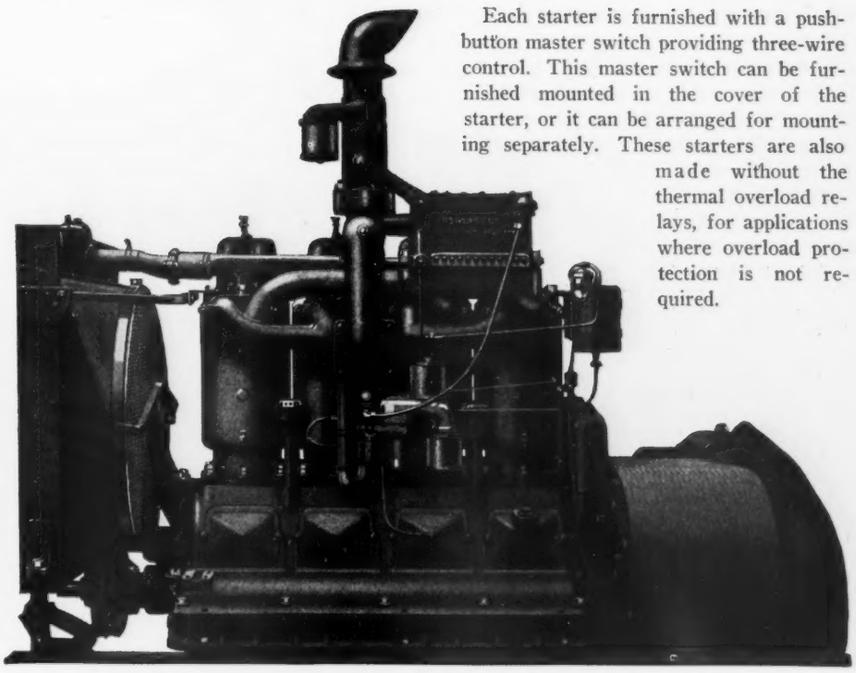
THE Northwest Engineering Co., Chicago, has announced a new oil burning engine for crane and shovel service. This new engine is based on gasoline motor principles, having the usual ignition system.

The essential features claimed for the new engine are: Proper developments of carburetor apparatus for low grade fuels, resulting in accurate metering; adequate vaporization of the heavier fuels to permit clean burning under extremely varying conditions of load, which are characteristic of crane and excavator operation; special combustion chamber shape which promotes clean combustion, together with suppression of undue detonation; special means for the elimination of lubricating oil dilution which would otherwise accompany the use of oils heavier than gasoline.

The engine is said to be free from complicated metering devices or pumps. Because its operation is identical to that of a gasoline motor and is understood by any operator or truck driver, the manufacturers claim gasoline motor dependability. Maintenance and care can be accomplished in the normal way without the necessity of special mechanics, it is said.

The new device, it is claimed, has been found to reduce fuel consumption approximately 10%, and burns fuels that can be purchased for much lower prices than gasoline. Fuels of a character suitable for the engine have a distillation range which extends from 195 deg. C. initial point to 365 deg. C. end point. This type of oil is readily available and in most districts can be bought from dealers without ordering in tank car lots.

The engine is started from cold on gasoline, for which a small tank is provided. A valve switches the fuel after a few minutes' running.

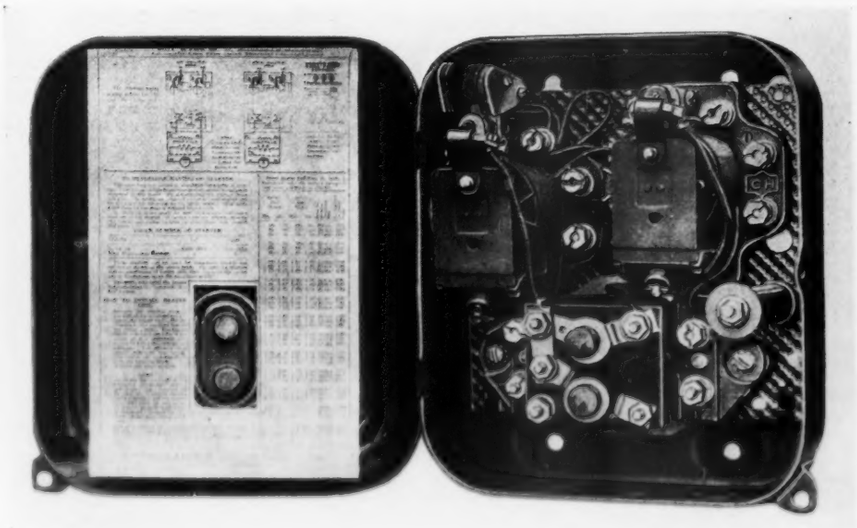


New oil-burning engine for crane and shovel service

A New D.-C. Across-the-Line Starter

A NEW automatic across-the-line starter for general applications of d.-c. motors up to 2-hp., 115 or 230-v., is announced by Cutler-Hammer, Inc., Milwaukee, Wis. Some features claimed for this new design are: small size, low cost, double line break, thermal overload protection, low voltage protection, silver contacts, and completely enclosed structure. Two magnetic contactors, one in each side of the line, connect the motor directly across the line on starting and provide a double line break. The contactors, designed especially for d.-c. service, have renewable silver contacts and a heavy stamped frame.

Each starter is furnished with a push-button master switch providing three-wire control. This master switch can be furnished mounted in the cover of the starter, or it can be arranged for mounting separately. These starters are also made without the thermal overload relays, for applications where overload protection is not required.



Across-the-line starter with overload relay for d.c. motors

New Brazing Furnace Uses Atmosphere of Hydrogen

A NEW brazing furnace, placed on the market by the General Electric Co., utilizes a gaseous atmosphere and is automatic in operation. The only labor involved in its operation is that necessary to keep the furnace supplied with work, according to the manufacturers. Perfection of the method of hydrogen brazing, announced by the General Electric Co. early in 1928, followed many years of development and research. This method brazes the parts together by means of a copper flux. While not new, it had previously been attended by a number of practical difficulties in application.

Jeffrey Company Purchases Bakstad Company

THE recent purchase of the Bakstad Crusher and Equipment Corp., Chicago, by the Jeffrey Manufacturing Co., Columbus, Ohio, rounds out the Jeffrey line of reduction machinery, the Jeffrey company states. Following the merger, J. R. Bakstad, designer of the crusher, joined the Jeffrey organization as manager of sales, crusher and pulverizer division and G. P. Puhl of the Bakstad sales staff will now handle sales of Jeffrey Bakstad units. Canadian sales will be handled by the Jeffrey Manufacturing Co., Ltd., with offices at Montreal and Toronto.

The Bakstad crusher, unique in its 3-jaw principle of reduction, was completely described and illustrated in ROCK PRODUCTS, August 6, 1927. It will now be manufactured and marketed by the Jeffrey company.

News of All the Industry

Incorporations

Smith Sand Co., Tulsa, Okla., $20,000. Ivan Stewart, 739 S. Phoenix St., Tulsa.

Central Materials Corp., Wilmington, Del., $52,500. To deal in lime, cement, etc.

O'Laughlin Materials Corp., Dover, Del., $47,500. To deal in lime, cement and plaster.

Jones Sand Co., Columbus, Ohio, $25,000. Harmon A. Jones, D. E. Armstrong and Eugene Carlin.

Belle Cheney Sand and Gravel Co., Opelousas, La., $30,000. J. P. Barnett and Albert Tate.

Salmon Sand Co., Newark, N. J., $100,000. William E. Sandmeyer, Newark.

Montvert Slate Co., Inc., Poultney, Vt., $50,000 (500 shares common at $100 a share).

Ready-Mix Concrete, Ltd., Montreal, Que., $200,000.

Columbus Gravel Co., Columbus, Ind., increased capital stock 100 shares, par value $100 each.

Hudson River Quarries, Wilmington, Del., 100,000 shares common.

Wilson Sand and Gravel Corp., Camden, N. J., $50,000 preferred and 1000 shares common.

River Sand Supply Co., Ltd., Montreal, Can., $74.750.

Rockland Crushed Stone Co., Ltd., Montreal, Can., $49,000.

Fithian Cement Products Co., Youngstown, Ohio, 20 shares, par value $100. D. R. Williams, C. J. and Adelbert Fithian.

Charles R. Harman, Inc., Elkridge, Md. Charles R. Harman and Charles A. Rawles. To deal in sand and gravel.

Camden Gravel Co., Camden, Ark., $20,000. George K. Force, Andy R. Taylor and Miriam A. Force.

Keyport Stone and Lime, Inc., Huntington, Ind., 1200 shares, par value $100 each, and 2800 shares common stock of no par value. Charles W. McKee, Emma McKee and Eben Lesh.

Fort Dodge Limestone and Clay Products Co., Ft. Dodge, Iowa, $100,000. J. H. Coughlon is president; L. W. Smith, vice-president and manager; C. D. Coughlon, secretary-treasurer; E. A. Conway, and R. P. Doud.

Quarries

Dufferin Paving and Crushed Stone, Ltd., Toronto, Can., has just secured a contract amounting to $250,000 from Welland county, Ont., for paving and road construction work.

Indiana Limestone Co., Bedford, Ind., reports that sales for the month of September were the largest in a year, with gross billings of $1,343,000, compared with $1,311,546 in August of this year and $1,189,795 in September, 1928.

Paint Rock, Tex. Initial steps towards the formation of a $100,000 stock company to develop a quarry proposition near here are reported to have been started. The rock, a blue limestone, is said to be suitable for road metal, concrete aggregate, etc., and is accessible for rail shipments.

Tom Laird's Stone Quarry, near Bono, Ark., has installed an $8500 air compressor and other machinery costing about $2000. A hammer mill will also be installed, and a half-mile switch track from the main line of the Frisco to the quarry is now being constructed.

C. C. Putman has opened a new quarry on the Reiling land near Bellevue, Iowa. The crushed rock will be used in the construction of wing dams in the Mississippi river. A quarry, in the vicinity of Buena Vista, will be opened later by Mr. Putman to supply material for government dams in that locality.

Henry Rudge and associates, claimants to the Haddington Island Quarry, Haddington Island, B. C., will seek an Appeal Court ruling on the judgment of the Supreme Court in dismissing their claim to the property, (see ROCK PRODUCTS, September 28). The quarry has twice been in litigation.

Sand and Gravel

Lind Gravel Co., Bellingham, Wash., on November 1 will move from 1525 Forest street to 1530 State street, Bellingham.

Cumberland River Sand Co., Nashville, Tenn., recently formed, has acquired plant of the Richardson Sand and Gravel Co. on Fatherland St., East Nashville.

T. L. Davison's gravel pit on the Ripon-Rush Lake road near Fond du Lac, Wis., has been acquired by the county highway commission at a reported sum of $1500 for the 12 acres.

Jackson Township, Iowa. According to L. B. Anderson of the State Highway Commission, Ames, Iowa, machinery is to be installed to operate on a large scale the state's big gravel pit here. A railway track will be built from Monteith, Iowa, to the pit.

Belle Cheney Sand and Gravel Co., Opelousas, La., incorporation notice of which appears in this issue, has acquired gravel property covering approximately 1000 acres, which is estimated as having 5,000,000 cu. yd. gravel. The company will construct a 2-mile spur line to connect the gravel pits with the Missouri Pacific railroad near Turkey Creek.

Cement

Florida Portland Cement Co., Tampa, Fla., has resumed operations with production nearly doubled over previous output. The company recently received order for 20,000 bbl. of cement to be used by the government in construction work at the Panama canal. This is the second big order of this character received, 10,000 bbl. having been shipped in January and 10,000 in February.

Lehigh Portland Cement Co. has installed a new No. 490 Marion all-electric power shovel in its limestone quarry at Metaline Falls, Wash., this summer. The limestone quarry is located at about 1000 ft. elevation above the mill site, the road has a grade of 18 deg. at places and goes through marshy ground at places and around rock clefts at other places. This shovel weighs almost 80 tons.

Lime

Standard Lime Co., Birmingham, Ala., which acquired the property of the Calera Lime Works at Calera, Ala., now has three kilns in operation. Harry Burgess is president.

Palmyra Lime Co., Clarksville, Tenn., has been reorganized and resumed lime manufacturing operations after a lapse of about five years. The reorganized company is composed of G. W. Dinsmore and Att. Powers.

Gypsum

United States Gypsum Co., Chicago, Ill., is opening an office at 417 Architects and Builders Bldg., Indianapolis, Ind.

Structural Gypsum Corp., Linden, N. J., has expansion plans under consideration for its Akron, N. Y., plant. J. R. Haskins, special engineer of the company, spent several days at the plant making a survey for this purpose.

Agricultural Limestone

Peoria County, Ill. The Farm Bureau has received orders for 150 carloads of agricultural limestone for farmers of this county since January 1. The cost varies to different points in the county, namely, from $1.05 to $1.90 a ton delivered.

New Hampton, Iowa. A total of 850 tons of agricultural limestone was distributed to farmers of Chickasaw county recently. This is the third trainload of limestone to be delivered in the county, making a total of about 3200 tons used in the county.

Franklin County, Ill. Approximately 4400 tons of agricultural limestone has been shipped into this county within a few weeks. This is about one-half the limestone that will be spread in the county this year, according to Farm Advisor E. E. Glick, and about twice the amount ever used in this vicinity in any previous year.

Waverly, Iowa. An agricultural limestone demonstration, sponsored by the Bremer County Farm Bureau and attended by 400 men, was held at the Oltrogge farm near here recently. How the limestone should be spread for best results and examples of results obtained with limestone-treated soil were shown. It is estimated that fully 100 carloads will have been used this fall in Bremer county, not counting that supplied by local quarries.

Cement Products

Keystone Concrete Products Co., Bethlehem, Penn., suffered a loss of several thousand dollars when a fire of unknown origin recently destroyed one of the large buildings at its plant.

Granite Concrete Stone Co., which for 18 years has had its plant and offices in Milwaukee, during the early part of November will move to New Butler, Wis., to occupy its new plant, recently completed.

L. G. Everist Co., Sioux City, Iowa, has announced plans for a $100,000 investment in the new river front industrial development at Dace and Virginia streets, to include fine office and complete equipment for handling building materials, ready-mix concrete and coal.

J. G. Oswalt, Danville, Ill., has acquired the interest of Edward Mathie, who is retiring from active business, in Mathie Bros. Tile and Marble Co., Champaign, Ill. Mr. Oswalt will become associated with Fred Mathie in the business. He will continue to spend much of his time in Danville, where the company has considerable business.

National Drain and Tile Co.'s plant at Hillsdale, Ill., which has been closed three years, will be reopened soon. According to Lee R. Whitney, general manager, a force of fifty men are now preparing the plant for resumption of operations. When in capacity production a staff of nearly 80 will be employed. Fred Overpeck will be superintendent of the plant.

Miscellaneous Rock Products

W. L. Spoon, Winston-Salem, N. C., has acquired a deposit of sandstone at Pilot Mountain, N. C.

Grosse Bros., San Francisco, Calif., has leased part of the Pacific Portland Cement Co.'s abandoned plant at Cement, five miles north of Fairfield, Calif. The company has acquired large deposits of onyx in the hills adjacent to the plant which will be mined and shipped.

U. S. Mineral Co. is now constructing a road from its plant site at Burnsville, N. C., to the railroad, and when completed will erect plant to fiberize and grind amphibole asbestos. The company also has deposits of mica and soapstone to be developed.

American Manganese Fertilizer Co., Alexandria, Va., has secured a number of mining properties containing large deposits of limestone and manganese deposits and will manufacture fertilizers at its plant on South and Lee streets. Officers of the company include Albert S. Dulin, president; Malcolm W. Morgan, vice-president; Frank R. Porter, secretary, Potomac Bank, Washington, D. C.

Personals

Robert McTammany has been made general sales manager of the B. F. Goodrich Co., Akron, Ohio, succeeding L. A. McQueen, resigned.

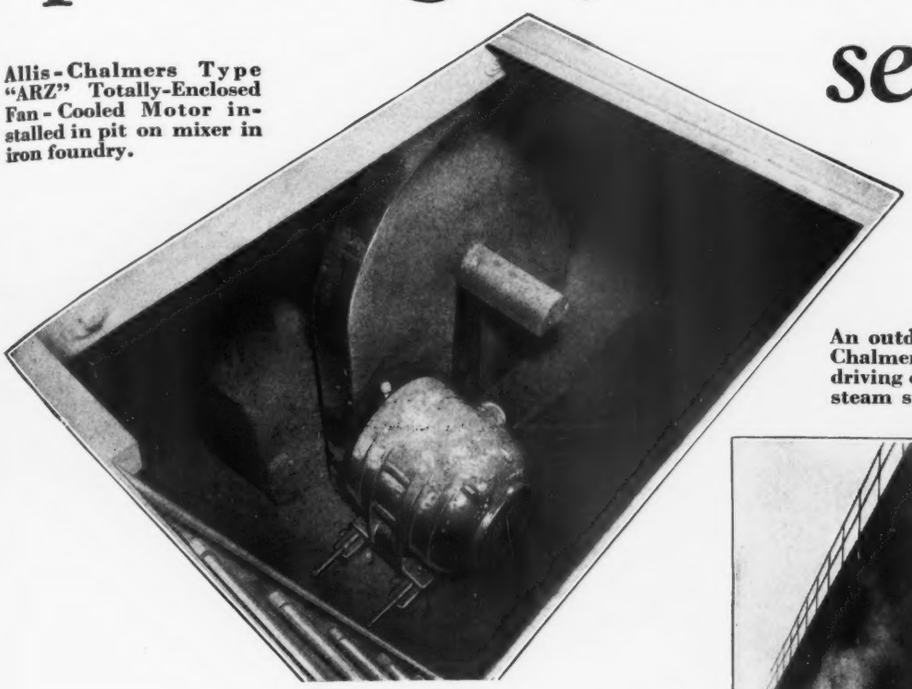
P. C. Hodges, vice-president of the Marble Cliff Quarries Co., Columbus, Ohio, has been named chairman of the transportation committee of the Columbus Chamber of Commerce.

Ross Davis, an employe of the France Quarries Co.'s plant, Kenton, Ohio, is recovering from a fracture of the right arm, caused by a fall at the quarry.

Hugh Rider, for several years connected with the Gypsum, Ohio, plant of the United States Gypsum Co., Chicago, has been transferred to Oakfield, N. Y.

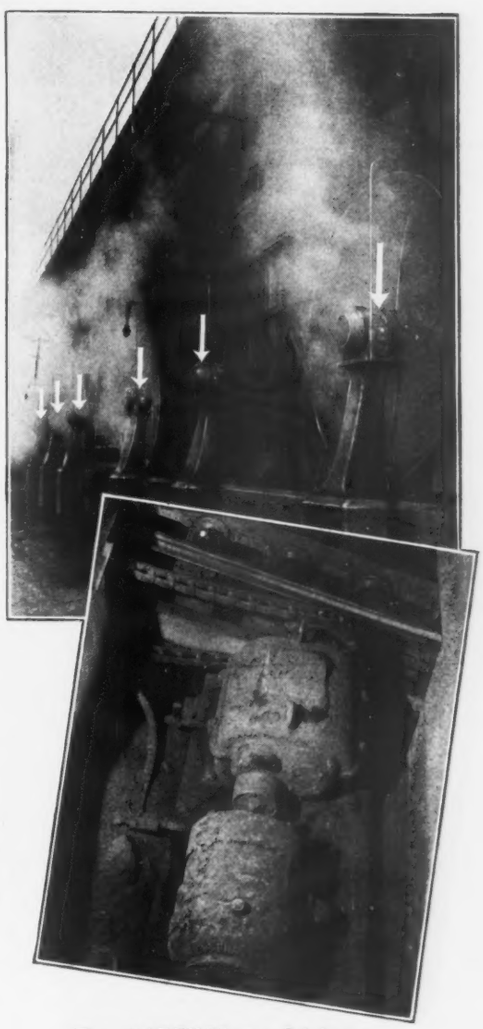
F. M. Coogan of the Alpha Portland Cement Co.'s New York staff, who incurred severe injuries from a fall while riding on his horse, has

Speaking of severe service—



Allis-Chalmers Type "ARZ" Totally-Enclosed Fan-Cooled Motor installed in pit on mixer in iron foundry.

An outdoor installation of Allis-Chalmers Type "ARZ" Motors driving cooling tower fans. Note steam surrounding motors.



WHERE are the "severe service" jobs for motors in your plant? Wherever they are, and whatever the motor problem presented, there is an Allis-Chalmers Motor to efficiently handle it.

The illustrations show some of the jobs the Allis-Chalmers Type ARZ Totally-Enclosed Fan-Cooled Motors are handling.

The solid cast iron bearing housings are designed as complete enclosures in these motors. These housings carry the rotor and are fitted with apertures for taking air gap measurements. By means of this design the separately attached coil enclosing devices with their auxiliary seals are avoided. The grease-packed bearings are the only shaft seals against the interchange of inside and outside air.

The stator windings and rotor and all parts subject to destruction are thus sealed against the entrance of dirt or dust.

These Allis-Chalmers Totally-Enclosed Fan-Cooled Motors will remove the "grief" from your motor operation where severe conditions exist. Maintenance becomes negligible and the uninterrupted service required in the modern industrial plant is assured.

ALLIS-CHALMERS MFG. COMPANY

Milwaukee, Wis.

District Offices in all Principal Cities

Type "ARZ" Motor driving an apron conveyor under a shake-out pit in a large steel mill.

ALLIS-CHALMERS MOTORS

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completely recovered and is back at the company offices.

A. D. Brown of the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has been appointed district manager of the Buffalo, N. Y., office of the company to succeed M. W. Phelps, resigned. For the past year Mr. Brown has acted as special factory representative for the Pittsburgh transformer division of Allis-Chalmers.

Walter S. Keith, Northwest manager for the Standard Gypsum Co., whose plaster plant is located at Seattle, has resigned his position with the company. Mr. Keith, a mining engineer, who had operated copper smelting plants on the Pacific Coast for ten years, entered the building material field with the Cowell Lime and Cement Co. at Portland, Ore., in 1913, and after four years joined the Pacific Lime Co., Ltd., as Northwest manager, remaining with that company until 1925, but transferred then to the Standard Gypsum Co., which was then arranging for the construction of a plaster plant in Seattle. After a short vacation, Mr. Keith will look for other building material connections. His successor has not yet been announced.

Obituaries

Frank Henderson, manager of the Cleveland office of Combustion Engineering Corp., New York City, died suddenly September 25 in his 53rd year.

Orla Barnes, Rockford, Ohio, was crushed to death recently when he became caught in a belt and drawn between the belt and a pulley at the plant of the Jonesville Gravel Co., Jonesville, Mich.

Manufacturers

Wagner Electric Corp., St. Louis, Mo., announces the appointment of J. B. Holston as branch manager of the St. Louis sales office.

Byers Machine Co., Ravenna, Ohio, has appointed W. H. Anderson Tool and Supply Co., Detroit, Mich., as its Michigan distributor.

General Electric Co., Schenectady, N. Y., has received orders for four additional 3000-hp. electric locomotives from the Great Northern railroad, to cost about $250,000 each.

Palmer-Bee Co., Detroit, Mich., announces the appointment of George M. Demorest as district representative for its complete line in Pittsburgh and vicinity.

Combustion Engineering Corp., New York City, has opened a district office at Room 606, 1411 Fourth Ave., Seattle, Wash. George M. Bechtel, recently of the Los Angeles office of the company, has been appointed branch manager.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., was awarded a $500,000 contract for electrical equipment, including three large substations, to supply power for handling bulk coal and ore at Presque Isle, Ohio, for the Hocking Valley railroad.

Republic Iron and Steel Co., Youngstown, Ohio, is installing power drives at its Youngstown plants, replacing steam. At Warren, Ohio, the company has broken ground for a new mechanical tubing plant to cost approximately $1,000,000. Negotiations for the acquisition of Union Drawn Steel Co., Pittsburgh, are now under way.

General Refractories Co., Philadelphia, Penn., has appointed the Desch Supply and Equipment Co., 16 S. Frederick St., Baltimore, Md., as dealer representative for their high temperature cement in the state of Maryland. They will cover all the territory in this state east of Allegany county and west and north of Chesapeake Bay, also Washington, D. C.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., is planning expansion of its tractor-making facilities at Springfield, Ill., and Westallis, Wis. The addition to be built at Springfield will double the capacity of the plant, and a large forge plant will be built at Westallis at a cost of more than $1,500,000. A motor plant will also be built at the Westallis works.

Westinghouse Electric and Mfg. Co., East Pittsburgh, Penn., announces the appointment of H. C. Thomas as director of manufacturing stocks. Mr. Thomas is being advanced from the position of assistant general manager of the merchandising department. He has been with the company since 1910.

The Oxweld Acetylene Co., New York City, has added to the Prest-O-Weld line a two-stage oxygen regulator designed to eliminate fluctuation in working oxygen pressures. The new regulator, known as type R-109, incorporates the stem-type valves which have proved satisfactory in single-stage regulators. The chief feature of the improved design, which supersedes the type R-105, is two-stage pressure reduction, accomplished through the medium of two independent sets of diaphragms, valves and springs.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Fuel. Bulletin outlining advantages of Black Knight specially prepared smithing coal. RALEIGH COAL AND COKE CO., Cincinnati, Ohio.

Testing Laboratory. A 32-page, illustrated brochure outlining the professional service and facilities offered by the PITTSBURGH TESTING LABORATORY, Pittsburgh, Penn.

Flexible Couplings. New handbook on Poole flexible couplings, their operation, installation, lubrication and maintenance. POOLE ENGINEERING AND MACHINE CO., Baltimore, Md.

Car Spotter. Brochure on the uses of capstan and drain type car pullers manufactured by the WELLER MANUFACTURING CO., Chicago, Ill.

Portland Cement. Circular illustrating a number of examples in construction work where Diamond portland cement has been used to advantage. PACIFIC COAST CEMENT CO., Seattle, Wash.

Construction Costs. Reprint of an article entitled "Construction Control by Service Contract," by L. M. Richardson. MORTON C. TUTTLE CO., Boston.

Triangular Block Cut for Mining Limestone. C. H. Coale in a recent issue of the Explosives Service Bulletin discusses this method of drilling and blasting. E. I. DU PONT DE NEMOURS & CO., Wilmington, Del.

Fire Brick. Folder commemorating 85th anniversary of the introduction of Laclede fire brick and outlining advantages of same. LACLEDE-CHRISTY CLAY PRODUCTS CO., St. Louis, Mo.

Gasoline Hammer. Circular describing "Rodax" gasoline powered pavement breaking machine for breaking concrete, driving sheeting, digging frozen ground, tamping and similar purposes. RODAX CORP., Chicago, Ill.

Flow Meters. "Why You Should Use Flow Meters" is the title of an interesting booklet outlining 24 ways in which flow meters reduce steam costs. BROWN INSTRUMENT CO., Philadelphia, Penn.

Pulverizers. Bulletin illustrating and describing various types of pulverizers and telling uses for which each particular type may be adapted. RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill.

Dust Recovery. Bulletin **No. 3A** containing reprint of an article from Industrial and Engineering Chemistry on "Present Trends in Dust Recovery." DUST RECOVERY AND CONVEYING CO., Cleveland, Ohio.

Steam Pressures. Article by W. A. Shoudy, consulting engineer, New York City, on "Steam Pressures for Industrial Plants Determined by Rational Factors." COMBUSTION ENGINEERING CORP., New York City.

Blast Hole Drills. Bulletin **No. 98** illustrating and describing No. 29 all-steel electric arc-welded blast hole drill with full length caterpillar treads for mines and quarries. ARMSTRONG MANUFACTURING CO., Waterloo, Iowa.

Concrete and Clay Tools. Bulletin **87-A** describing the "M-1" model clay spader. Bulletin **87-B,** covering pneumatic concrete breakers and pile hammers. Completely illustrated. SULLIVAN MACHINERY CO., Chicago, Ill.

Welding Rods. Bulletin **No. 4** covering Type-S welding rod for welding the 18-8 chrome-nickel and similar alloy steels which resist corrosion and elevated temperatures. FUSION WELDING CO., Chicago, Ill.

"Detonator Facts." This is No. 1 of a series of leaflet talks concerning the development, manufacture and use of blasting caps and electric blasting caps. HERCULES POWDER CO., Wilmington, Del.

Vertical Diesel Engines. Attractive 24-page catalog, No. **505,** illustrating and describing new four-cycle vertical Diesel engine with patented cylinder head feature. BUCKEYE MACHINE CO., Lima, Ohio.

High-Early-Strength Cement. Saving time in construction with the use of "INCOR" Perfected High-Early-Strength portland cement is discussed in new bulletin of INTERNATIONAL CEMENT CORP., New York City.

Wire Cloth. Four-page bulletin, entitled "Wire Cloth—All Meshes—All Weaves—All Lengths—All Widths—All Metals," showing a number of typical examples of wire cloth varying from 1-in. space to 400-mesh. NEWARK WIRE CLOTH CO., Newark, N. J.

Nickel Cast Iron. Folder showing users and uses of nickel-cast iron, the proper use of nickel as an addition to cast iron, and the characteristics of the material. STEEL SALES CORP., Chicago, Ill., distributors for INTERNATIONAL NICKEL CO., INC., 67 Wall St., New York City.

Portland Cement. "Making Ideals a Practical Every-Day Reality" is the title of a folder telling of the management, service, policies and resources of the Lone Star Cement companies and their parent company, INTERNATIONAL CEMENT CORP., New York City.

Fuel Burning and Steam Generating Equipment. New and revised edition of general catalog **GC-5,** illustrating and describing more important fuel-burning and steam-generating equipment manufactured by the COMBUSTION ENGINEERING CORP., New York City, N. Y.

Tractors. "Mines, Quarries, Clay Plants" is title of booklet showing pictorially the many uses, such as stripping overburden, belting crushers, moving tracks, etc., of "Caterpillar" tractors in working rock, ore and clay. CATERPILLAR TRACTOR CO., San Leandro, Calif.

Bucket Loader Equipped with Vibrating Screen. Excavating, screening and loading in a compact, one-man, crawler-mounted self-feeding unit, consisting of improved Model 42 bucket loader equipped with a Leahy vibrating screen. BARBER-GREENE CO., Aurora, Ill.

Steel Horses for Display Purposes. Bulletin on pressed steel horses for setting up temporary tables or benches for display purposes, available in ranges of 6-in. heights from 18 to 48 in., made for 1-in. lumber and 2-in. lumber. TOLEDO PRESSED STEEL CO., Toledo, Ohio.

Steel Belt Conveyors. Catalog No. **17,** giving a general description of the flexible steel conveyor known as the Sandvik belt, and listing a number of materials which this belt is adapted to handle. BODINSON MANUFACTURING CO., San Francisco, Calif.

Nickel Cast Iron. Bulletin giving a simple presentation of the relative characteristics of plain and nickel-bearing cast iron, and describing ten of the more important features of the alloy cast iron. THE INTERNATIONAL NICKEL CO., INC., New York City, N. Y.

Combined Pneumatic Conveying and Dust Collecting System. Bulletin No. **516,** giving the details of this type of "Dracco" installation, and Bulletin No. **56,** telling how fly-ash nuisance was eliminated with "Dracco" filters. THE DUST RECOVERING AND CONVEYING CO., Cleveland, Ohio.

Rock Drills and Related Products. General catalog, completely illustrated, giving essential information for purchasers of air-operated equipment, including complete lists of machines and accesories to go with a compressor of given size and to accomplish work of a definite nature. THE CLEVELAND ROCK DRILL CO., Cleveland, Ohio.

High-Early-Strength Concrete. Comprehensive folder showing how most satisfactory results may be obtained with Alpha cement in making high-early-strength concrete. Folder gives instructions on proportions of materials, mixing and curing. ALPHA PORTLAND CEMENT CO., Easton, Penn.

Sheets-Tubes-Rods. Folder on these products in standard or special forms, cut to size, machined or punched, and available in "Textolite Laminated" material. This material has heat-resisting properties, is insoluble in practically all solvents, and unaffected by hot or cold water. GENERAL ELECTRIC CO., Schenectady, N. Y.

Cog Belt Drives, Welding Sets and Drum Controllers. Bulletin **No. 20392,** explaining uses and construction of cog belt drives for industrial service. Bulletin **No. 20340-B** covering new 300- and 400-ampere single operator welding sets, portable and stationary. Bulletin **No. 20416,** describing new line of Type A, d-c. drum controllers for general reversing service and dynamic lowering hoist service. WESTINGHOUSE ELECTRIC AND MANUFACTURING CO., East Pittsburgh, Penn.

Core Drills. Bulletin **No. 85-D** on "Bravo-300" diamond core drill belt-driven by gasoline engine or electric motor. Bulletin **No. 85-E** covering type "20" diamond core drill; capacity, 1000-1150 ft. Bulletin **No. 85-F** on type "40" diamond core drill, a gasoline engine driven, truck-mounted, hydraulic feed machine, designed to drill to a depth of 1200 ft. Bulletin **No. 85-I,** hand-power type diamond core drill for mineral prospecting and engineers' test borings, not in excess of 100 ft. SULLIVAN MACHINERY CO., Chicago, Ill.

G.-E. Bulletins. GEA-261A, entitled "Electric Heat in Industry," illustrating the application of electric heat to groups of basic operations commonly found in industrial plants. **GEA-1146** on electric furnaces for industrial use. **GEA-1157,** covering general purpose strip heaters. **GEA-1152** on synchronous motors for pumping. **GEA-104A** on cartridge-type electric heating units. **GEA-1150** on electric heating equipment for electrotype-metal furnaces. **GEA-181B,** enclosed magnetic switches for alternating-current motors. **GEA-957-A,** mechanical-drive turbines, type D-53, condensing or non-condensing up to 600 hp., and up to 6000 r.p.m. **GEA-83A** on enclosed magnetic reversing switches for alternating current. GENERAL ELECTRIC CO., Schenectady, N. Y.